

The Iron Age

A Review of the Hardware, Iron and Metal Trades.

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Vertical Rolls for Bending Boiler Plate.

We show in the accompanying illustration, for which we are indebted to *Engineering*, the vertical rolls for bending boiler plate used at Palmer's Shipbuilding and Iron Company's Works at Jarrow-on-Tyne. The use of these vertical rolls suggested itself at Jarrow at a time when the firm had under consideration the question whether they should weld their boiler plates (being manufacturers of their own iron) should roll them as long as possible. In dealing with excessively long plates by the ordinary bending rolls a difficulty was experienced from the necessity of supporting the plates, and it was then suggested by their Mr. Gibbs that vertical rolls should be employed, such rolls enabling the plates to rest on their edges on the ground during the process of bending, and thus simplifying the whole operation. In accordance with this suggestion, a set of vertical rolls was made for the Palmer Shipbuilding and Engineering Company by Messrs. Scriven, of Leeds, and these rolls have ever since been in uninterrupted operation. There are, as will be seen, three rolls, two of these being at a fixed distance apart, and geared together, while the position of the third roll is adjustable in the usual way, according to the degree of curvature given to the plate operated upon. The arrangement for adjusting the position of the third roll is clearly shown in our engraving. The two fixed rolls are geared together, not only at their upper ends as shown, but also below the bed plate, which is level with the floor of the workshop. They are also geared below the floor level to a spur wheel on a short vertical shaft, which carries a bevel wheel at its upper end, this bevel wheel being geared into by a bevel pinion fixed on a continuation of the crank shaft of the small engine by which the machine is driven, this engine being fitted with reversing gear. In the case of the rolls at Jarrow this engine is not employed, the rolls being driven from the main line of shafting by open and crossed belts.

In dealing with the enormous plates now used in marine boilers, the procedure at Jarrow is as follows: The plate having been planed on the edges and punched and the lap corners planed off, is moderately heated, and is then set in the rolls to a curve marked on the floor of the shop, the arrangement of rolls enabling this to be done with great facility and exactness. As the sheet plates are thus prepared, one ring is placed above the other, and the whole bolted ready to be transferred to the drill, after which it is taken to pieces and sent to the boiler-erecting shop to be finally riveted together. For riveting, Tweddell's hydraulic riveter is largely used. It is now the general practice at Jarrow to construct their marine boilers of ordinary size with two plates only in each ring, and instead of making ordinary boilers three rings in length, they are now commencing to make them in two rings, the number of longitudinal butts being thus reduced to four instead of twelve, as formerly, while apart from the connections with the ends, there is but one circumferential seam. This is a most decided advance, but without the vertical arrangement of bending rolls it would be almost impracticable to deal with the enormous plates which the improved system of construction necessitates. These vertical bending rolls are now being adopted in nearly all the large works making marine boilers, and the arrangement is such a useful one that the fact of its having originated at the Jarrow works is well worth putting on record.

In going through this boiler shop the visitor has a good opportunity of seeing the size to which marine boilers are now attaining, there being in progress some double-ended boilers 16 feet 6 inches in diameter by 20 feet long, each ring being made of three plates only. These boilers are being made wholly of steel, and they are for a working pressure of 90 pounds per square inch; each boiler when finished will weigh no less than 80 tons, and the two boilers are expected to supply the steam required for indicating 3000-horse power.

SCIENTIFIC AND TECHNICAL.

A German—Herr Friedrich Lauterborn, of Durlach—is bringing out

AN IMPROVED METHOD OF MANUFACTURING ALUMINIUM.

Hitherto the process of making that metal has been expensive, because sodium had to be employed in producing it. Herr Lauterborn proposes to extract the soluble fluoride of sodium from powdered cryolite by boiling it with water, and then to treat the residuum—fluor calcium—by mixing it with sulphide of calcium and exposing the mixture to a red heat. The result will be a mixture of sulphide of aluminium and fluor calcium. The aluminium is separated by the addition of iron and subsequent exposure to a red heat, the fluor calcium acting as a flux. The reduction of sulphide of aluminium by means of iron is not new, but it could not be used until now for the manufacture of the metal, because the preparation of sulphide of aluminium required the action of bisulphide of carbon upon pure alumina—a tedious and costly operation.

It is stated that by an entirely new process

AN IMPROVED HECTOGRAPH

has been made. The principle upon which the process depends is this, that a superficial tanning of the gelatine, in the gelatine-glycerine pad, makes the surface, wherever tanned or rendered insoluble, capable of taking fatty inks, while the rest of the surface rejects it. In practice, then, it is only necessary to have a perfectly level hectographic pad, to write the copy with ordinary nutgall ink, to which a little extra tannin and extract of logwood has been added, and to transfer the writing in the ordinary manner upon the hectographic surface. Wherever the writing appears the surface becomes tanned, and on now applying a roller with printer's ink, the written characters alone take the latter. The pad is to be inked after each impression. It is said that 300 to 400 sharp copies can be made upon dry paper. The only material necessary, besides the hectograph, is a slab or zinc plate for spreading out the printer's ink, a small printer's roller with handle, and a roll of wood or paper or rubber for pressing the paper against the pad.

MM. Cailliet and Hautefeuille, the two eminent French scientists, have determined the density of liquid hydrogen, oxygen and nitrogen

by liquefying these gases, mixed with car-

some to remove. The Lauer system is calculated to effect a saving of fully 30 per cent. as compared with the old system.

It is stated that Messrs. W. H. Bailey & Co., of Salford, England, have just completed

AN IMPROVEMENT OF THE LEHMAN HOT-AIR ENGINE

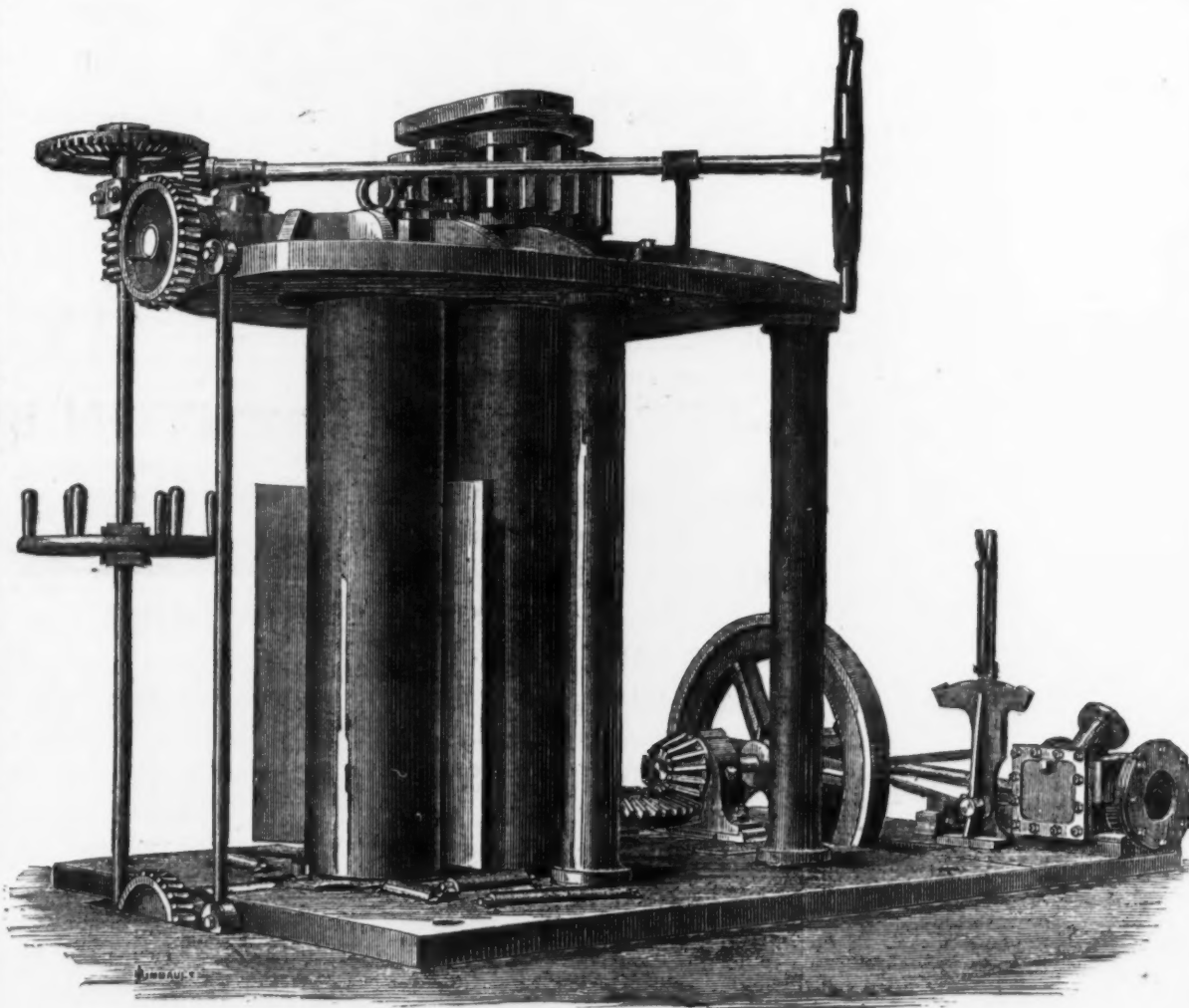
which practically doubles its working power. The essential feature of the Lehman engine is in the difference of temperature produced at the opposite ends of the cylinder, an increase of cold at one end being quite as economical as an increase of heat at the other. In Messrs. Bailey's improved engine, by an ingenious alteration of the water spaces at the cold end a more rapid condensation of the air has been effected, while a greater heating surface has been secured at the retort end.

Early Iron Making on the Tyne.

Mr. I. Lowthian Bell gives the following sketch of the history of the iron industry on the Tyne:

The cheapness of fuel and the easy access to the Thames from the Tyne were the probable causes which induced Ambrose Crowley, a citizen of London, to establish

ing about 11 cwt., without classifying them as extraordinary sizes. Pig iron was first smelted on the Tyne, at Lemington, about the year 1812. The late Mr. Clayton Atkinson gave the particulars of the cost of manufacture in the year 1812, which amounted to 105/6 per ton. Nearly 2½ tons of coke were used in the operation, equal, all included, to about 5 tons of raw coal, with a make of 49 tons per week from one furnace. Small rolling mills were erected at Lemington, and by Hawks & Co., at Gateshead, for working up old scrap iron, and larger works were afterward built by Losh Wilson & Bell, in 1827, at Walker, where the process of puddling iron was first practiced on the banks of the Tyne. Probably no manufacture has, during the last 50 years, made greater advance in the direction of economy than has the iron trade. Previous to the introduction of the hot blast, and partly owing to a very wasteful mode of coking, as much as 10 tons of coal was occasionally consumed in Scotland for the production of a ton of pig iron. Thirty years ago, when the first blast furnaces were built at Middlesbrough, this rate of consumption had been reduced to about 4 tons. After the lapse of a dozen years, by a great increase in the capacity of their furnaces, by the use of more highly heated air than that hitherto employed, and by the application



VERTICAL BOILER PLATE BENDING ROLLS.

bonic anhydride and with nitrous oxide, and basing their calculations on the assumption that the mixed liquids are without action on one another. The density of liquid oxygen at -23 degrees (pressure = 300 atmospheres) was found to be 0.89 from experiments with carbonic anhydride, and 0.94 from experiments with nitrous oxide; at 0 degrees the numbers obtained were 0.88 and 0.85 respectively. Liquid nitrogen at -23 degrees gave numbers corresponding with the density 0.44, while at 0 degrees the density was 0.37. The density of liquid hydrogen was 0.033 at -23 degrees, and 0.025 at 0 degrees. Dividing the atomic weights of the three elements by the densities at -23 degrees, the atomic volume of oxygen is found to be 17; of nitrogen, 31.8, and of hydrogen, 30.3.

Major Lauer, of the Austrian Engineers, has been testing

A NEW METHOD FOR BLASTING ROCKS UNDER WATER.

at Krems, on the Danube. The chief feature of Lauer's system is to employ a hollow cylinder, like a gas pipe, and to place the dynamite cartridge, not as hitherto in a hole bored into the rock to be blasted, but in the cylinder in question. The cartridge only touches the surface of the rock which it is desired to shatter. The explosion of the dynamite is effected by means of electricity, and the effect is said to be greater than with the usual cartridge in a hole bored in the rock. The rock is shattered into fragments so small that a fair stream is able to wash them away without help, whereas in the case of gunpowder the rock is only split up into blocks more or less large and trouble-

ironworks in 1690 at Winlaton, near this town, where different articles, including nail rods made by the slitting mill, were manufactured. Iron was a very much scarcer metal for long after the days of Crowley than it is in our own times. As late as 1740 the make of pig iron in the United Kingdom was only 17,350 tons, and it took a furnace a week in those days to run as much as a modern Middlesbrough furnace does in two hours. So recently as the beginning of the present century, Swedish bars were imported into the Tyne and converted into slit-rods, so that it is not unlikely that Sweden also furnished the raw material for the Winlaton Works, founded in 1690. Before the early part of the eighteenth century every morsel of iron used in the arts was drawn under the hammer. To a certain John Hanbury is ascribed the invention at that time of rolling iron plates by means of cylinders. This idea remained without further application until 1783, when Cort patented the rolling of bars by the means suggested by Hanbury. For a long time, however, the process was confined to making flat or square bars; indeed, Mr. Jos. Laycock, of Gosforth, remembers in his youth men working many a long day in forging squares into rounds, probably 30 years after the date of Cort's invention. Mr. Bell remembers the late William Longridge informing him of the elation of his firm at Bedlington, when they succeeded in turning out a boiler plate weighing 2½ cwt., and long after that day plates weighing 3 cwt., or more than 3 feet wide, were charged an extra price on account of the difficulty attending their manufacture. Now, plate rollers send out their iron in pieces weigh-

of the furnace gases to the steam boilers and to the hot blast stoves, the north country ironmasters had further reduced this to something under two tons of coal, while the make per furnace had been increased from 140 to 500 tons per week. To a Middlesbrough firm, Messrs. Bolekow, Vaughan & Co., under the able guidance of Mr. E. Windsor Richards, the great iron industry of the present generation is indebted for its last act of amelioration. This observation refers of course to the successful application of the so-called basic process, by means of which phosphiferous iron, like that of Cleveland, is capable of being employed in the Bessemer converter. The rolling machinery of the firm just mentioned has kept pace with the other improvements referred to, for out of one rail mill driven by two pairs of reversing engines, the invention of Mr. John Ramsbottom, and representing a power of 8000 horses, above 3600 tons of rails, in lengths of 90 feet, have been produced in one week. The manufacture of steel appears to have been carried on in the vicinity of Newcastle for upward of 300 years, first, it is believed by some Germans who settled at Shotley Bridge toward the close of the seventeenth century. Notwithstanding the cheapness of coal and the convenience of Newcastle as a port for receiving Swedish iron and for exporting the products, Newcastle never attained any eminence as a steel manufacturing center. Nevertheless the house of Spencer has distinguished itself by the quality of its products in crucible and other varieties of steel, to which in recent years they have added a large trade in steel made in the regenerating furnace of Siemens.

The Cable Steamer Faraday.

The cable steamer Faraday, which is now employed in laying the second Atlantic cable from Cornwall, England, westward, has on board a thorough equipment for special work. A correspondent writes:

As you know, the Faraday, after the Great Eastern, is one of the largest vessels afloat, being 305 feet long, 52 feet beam and 30 feet deep. She is so deep, in fact, that whenever she lies in the Thames they have to dig a cradle for her at Woolwich in the river bottom to float her. The wonderful speed with which she does her work is due to the perfection of her equipments. She is fitted up with electric lights of two patterns. Her deck is lighted with the new Siemens light, of the effects of which on the ocean, even before it had attained its present perfection, Mr. Laurence Oliphant gave you such a striking description after his voyage home in the Faraday three years ago. Her main saloon is lighted with the Swann electric light. Thanks to this perfect illumination, the men on board can work night and day with equal ease, and such is the excellent adjustment of her machinery that it makes little difference to her what the weather may be or the rolling of the sea. She has three cable tanks—fore, aft and amidships—filling the whole width of the ship. These are of iron and are water tight, and they are so arranged that as fast as the cable is paid out water can be taken in as ballast to steady the ship. The cable is coiled into the bottom of the tanks from the inside to the outside. It is paid out in reverse order from the outside to the inside. The height of the cable is brought up through a kind of cage called a crinoline, passed over a revolving wheel, carried along down a shoot astern about 30 feet in length, and then passed between three sets of superposed wheels, which act either as drags to retard or spurs to accelerate the paying out of the cable, according to circumstances. Emerging from these, the cable is passed three times around an 8-foot drum, whence it goes to a dynamometer fixed about 30 feet further astern. From this it is carried over the stern of the vessel by a wheel so rigged as to pay the cable out at any angle. When the weather is very rough they take an extra bight in the cable from the drum and carry it forward about 100 feet through another triple set of wheels and another dynamometer. This prevents any sudden strain from snapping the cable. The drum acts as a brake and an automatic recorder, which gives the amount of strain on the cable as it passes over, and the strain can be so regulated as to secure a uniform slack not varying far from 5 per cent.

A recent communication to the French Academy of Sciences announces a new method of taking photographs in color, which, although it is not a solution of the prime problem for photographers, how to produce nature in her own hues, is at least some mechanical approach to it. It is the invention of MM. Ch. Cros and J. Carpentier, and consists in taking three separate photographs of the red, yellow and blue tints, then combining them. Three negatives of the object are first taken, one through a screen of orange liquid, one through a screen of green liquid, and one through a screen of violet. The varying opacities and transparencies of these negatives indicate the relative qualities of red, yellow and blue tints in the object. The proofs are taken on plates of glass, coated with coagulated albumen, which has imbibed bichromate of ammonia. A transparent negative, or first photograph, is applied to one of these, and exposed for some minutes to a diffused light, so that the transparencies and opacities of the negative shall imprint themselves on the sensitive albumen. The proof plate is then plunged into a coloring bath, and in the parts protected by the opacities of the negative the coloring matter spreads and fixes itself. By repeating this operation with the three different negatives the three colors are combined on one glass plate, and a fair imitation of the original object is the result. Of course, for the image obtained through the green screen the coloring bath is red, for that through the orange screen blue, and that through the violet screen yellow. The same screens and pigments serve to reproduce all sorts of polychromes. The screens hitherto used are glass vessels filled with solutions of chloride of cobalt, chromate of potash and sulphate of copper. When the electric light is used the screen is put before the lamp, so that the object will be illuminated by a monochromatic light and photographed in the ordinary way.

The Birmingham correspondent of the *Engineer* writes as follows: American buyers of hoops would seem to have made up their minds that English prices are likely to continue to rise. Some makers announce this week that they are in receipt of communications from United States consumers offering to take the whole of their next year's output. But such offers meet with no acceptance. Although it is left with makers to name a reasonable price, they refuse to entertain the idea; for they are already sold as far forward as for the present they care to be. Prices remain at about £6.10/ to £6.15/ at the works for ordinary sorts, though common sorts can be had as low as £6, the marked iron firms, however, demanding £8.



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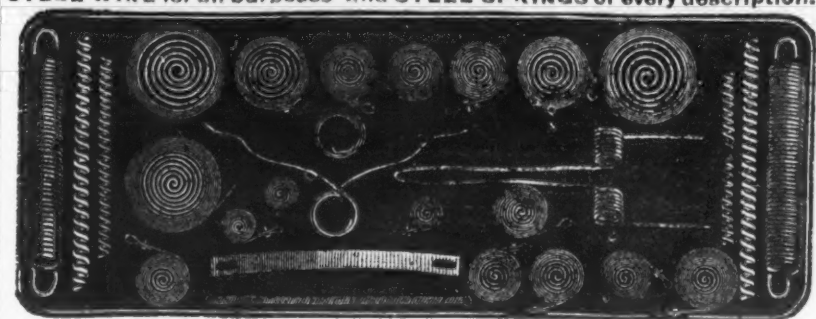
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Hardware in New Zealand.

A special correspondent of the *Ironmonger*, writing from two points in New Zealand, gives some information about the competition of American and English hardware in that colony which will be of interest to many of our readers. Writing from Dunedin he says:

"In New Zealand the double-furrow plows are preferred. The usual system is for large farmers (squatters) to employ their smaller neighbors, who do the work by contract at prices varying from 4 to 6 shillings an acre. It is probable these prices will create some surprise in England. A man with three or four horses will plow per day two and a half to three acres. He does not make much by the operation, but it is better than keeping himself and his horses idle. Sulky plows are becoming popular in the colony; it is claimed for these that the work is more like digging. As the result of conversation with some of the leading importers of hardware I send you the following, which I give you in good faith and 'without prejudice,' as the lawyers say: Putnam's horseshoe nails, packed in 25-pound boxes, have the market. The Strohley Company have sent out sample shipments; of these the complaint is that they are clipped instead of forged, and therefore do not realize as high a price as Putnam's; in this part of the world hoofs are very hard in the summer, which nailmakers should bear in mind. Nettlefold's carriage and tire bolts are reported not yet up to American, but importers believe they soon will be. English pumps, it is stated, do not work so evenly as American, and are no cheaper. Wire nails come from the Continent, and I am asked why. American lightning hay-knives cut twice as fast as those of Sorby, Lyndon, or Tyzack, at about the same prices. Screw-wrenches, hitherto supplied by C. Johnson & Co., costing 4/3 dozen, are superseded by those of A. C. Coes & Co. at 1/10; at the same price it is believed the former would not be preferred. Bull holders from America, costing 4/7 dozen have taken the place of Messrs Timmins' make at 3/9. In brass goods Birmingham is almost supreme; lamps formerly imported largely from United States are now procured from England, the burners being superior; but some importers are getting the heads from Birmingham and stands from America; the better styles being the more saleable. Gilpin's bits, nicely packed, suit the market and keep it. Hammers have been shown me of Stowe's make, costing 13/6, superior in style and finish to those of Atkins & Son at 17/. The trade for picks is returning to England, but axes, I need hardly mention, are supplied almost exclusively by Sharp and Collins. Messrs. Yates have sent out some. They are considered somewhat awkward, and do not meet with a ready sale. Importers who have read the letter of Messrs. Mawhood in your issue of February 10 are, after their past experience, somewhat incredulous. If English makers are really in a position to compete they would be wise to send out specimens with lowest prices. Particular attention should be paid to the handles and to the packing. Diston's saws meet with a limited sale. Ames's shovel may be stated to monopolize the market; report says that English makers admit they cannot produce at the same prices. Where prices are given it may be considered that the Americans are recent, the English some time back. Being generally old stock, the prices are the cost here, including all charges into store. Iron and steel being cheaper in England than in America, how is it that in articles made from these metals the trade is so largely with the latter country? This is a question frequently asked. Under another cover I send you the prices current of a leading New York export firm for January and April. It will be observed there are considerable variations."

Writing from Wellington, he says: "I have gone into the question of English and American goods here again, and am told by the best houses in the trade that the actual state of affairs is about as appended: Electro-plated crucibles—American, such as Reed & Barton's, at \$2.25 to \$4, are preferred. Axes, hatchets—American makes, say, Collins, Hunt, Sharp, Simmons, Weed, Hurd, &c., have the trade. Adzes, whether railroad, square-head, ship carpenters', spur-head, coopers', or otherwise—English makes have the preference, and all things considered, are found the best. Picks for railway or mining uses—United States makers have the bulk of the business, except adze-eye picks and matts, in which lines English firms, especially Messrs. Parkes, are regaining ground formerly lost. Shovels—American preferred, and have best sale. Spades—English sell most freely. Hoes—Trade runs about two-thirds English and one-third American. Forks, rakes, &c.—All American, some of the garden rakes being of steel. Scythes—Mostly English. Hammers and other carpenters' tools—Largely English. Chisels (firmer)—Trade about equally divided. Augers—English, chiefly Messrs. Gilpin's, have the market. Braces and bits—Americans have quite cut out the English. Screw-drivers and drawing knives—English makes have the market, the American goods of these sorts being designated mere rubbish—Saws of all kinds—Diston's 'Great American-tooth saw' sells best. Rules—English; Messrs. Rabone's make have recovered the market. Levels—American are considered best. Try-squares, planes of all kinds—English goods have the market entirely. Grindstone hangings—All American. Saw sets—English (Winn's) have the market. Wrenches—American preferred. Rim and mortise locks—American sell best, and are recommended by the local architects. Horse nails—Putnam's have an increasing sale. Belting and bands—English goods are recovering the trade, the American belts being too soft. Pruning shears—Henry's sell best for sheep's hoofs. Can openers—A large trade, about equal. Sad irons and charcoal iron—English, made by Messrs. Salter and Messrs. T. & C. Clarke, are preferred, and both have beaten the Americans. Elliptic carriage springs—English preferred. Axles—Almost exclusively American. Carriage and tire bolts—American sell best, because the nuts are better fitted. Hand pumps—American have the market. Rubber hose—English. Scales and weighing machines—English (Messrs.

Avery) preferred, and are now crowding out the Americans. Rides—Mostly American, such as the Winchester."

**Statistics of the American Iron Trade
in 1880.**

BY JAMES M. SWANK.

Concluded.

**PRODUCTION OF IRON AND STEEL RAILS IN
1880.**

The production of rails of all kinds in the United States in 1880 far surpassed that of any previous year. It reached the enormous quantity of 1,461,837 net tons, or 1,305,212 gross tons. This is 31 per cent. more than the production of the next most productive year, 1879, in which 1,113,273 net tons, or 993,993 gross tons, of iron and steel rails were made. The rail product of 1880 was composed of 954,460 net tons of Bessemer steel rails, 493,762 tons of iron rails, and 13,615 tons of open-hearth steel rails. The total production of 1880 was 348,564 net tons more than that of 1879; that of Bessemer steel rails was 270,496 net tons, or 40 per cent., more; that of iron rails was 73,602 tons, or 18 per cent., more; and that of open-hearth steel rails was 4466 tons, or 49 per cent., more. The Bessemer steel rail production here given includes 36,868 net tons of rails rolled by iron rolling mills mainly from imported blooms. The quantity of Bessemer steel rails rolled in 1880 by the Bessemer steel makers themselves was 917,592 net tons.

The production of street rails in 1880 is included in the total production for the year, and amounted to 16,894 net tons, of which 8055 tons were Bessemer and open-hearth steel rails, and the remainder were iron rails. The production of street rails in the seven preceding years was as follows: 1873, 9430 net tons; 1874, 6739 tons, of which 1000 tons were Bessemer steel; 1875, 16,340 tons, of which 2308 tons were Bessemer steel; 1876, 13,086 tons, of which 3563 tons were Bessemer steel; 1877, 7015 tons, of which 1269 tons were Bessemer steel; 1878, 9229 tons, of which 1710 tons were Bessemer and open-hearth steel; 1879, 8646 tons, of which 5813 tons were Bessemer and open-hearth steel.

The production of iron and steel rails in this country since the beginning of the manufacture of Bessemer steel rails has been as follows, in net tons:

Years.	Open-Hearth Steel Rails.	Iron Rails, all kinds.	Bessemer Steel Rails.	Total.
1867.....	450,538	2,550	459,108	
1868.....	490,419	7,225	506,714	
1869.....	583,936	9,650	593,586	
1870.....	596,000	34,000	630,000	
1871.....	737,483	28,250	765,733	
1872.....	905,930	94,070	1,000,000	
1873.....	761,062	102,015	863,077	
1874.....	584,460	144,944	729,404	
1875.....	591,646	25,563	617,209	
1876.....	467,863	472,461	940,324	
1877.....	332,540	434,169	766,709	
1878.....	322,890	550,398	873,288	
1879.....	6,149	493,762	500,000	1,000,000
1880.....	13,615	493,762	954,460	1,461,837

Included in the column of iron rails are a few tons of crucible steel rails and steel-headed rails, which it has not been thought necessary to classify separately. No crucible rails have been made since 1874, and but a few tons in that or in any preceding year. The production of both the classes of rails mentioned was as follows in 1873 and 1874: 1873, 26,377 net tons; 1874, 17,181 tons. The production of steel-headed rails in the last six years has been as follows: 1875, 10,436 net tons; 1876, 12,791 tons; 1877, 5844 tons; 1878, 2288 tons; 1879, 9031 tons; 1880, 12,730 tons. The Elmhurst Iron and Steel Rolling Mill Company, at Elmhurst, N. Y., made all the steel-headed rails that were made in 1879 and 1880, using "silicon tops."

Hon. Joseph Nimmo, Jr., Chief of the Bureau of Statistics, states that in the year which ended December 31, 1880, there were about 65,000 net tons of steel blooms imported into the United States. They were valued at \$1,708,100.

The production of 1880, large as it was, will be exceeded in 1881. Not only does the heavy demand for rails continue, but the facilities for their manufacture are being largely increased. The new works of the Pittsburgh Bessemer Steel Company, Limited, at Homestead, which were started on March 29 of this year, are making rails. The Bessemer steel works of the Colorado Coal and Iron Company and the new steel works of the North Chicago Rolling Mill Company will probably manufacture rails before the close of the year. Nearly all of the other Bessemer steel works are increasing their capacity for the manufacture of rails, and the effect of their enlarged capacity will be noticeable before the year is over. Iron-rail mills were actively employed during the first half of the year, and in many cases were running on steel rails rolled from imported blooms, or from blooms furnished by domestic steel makers.

The following table will show approximately the consumption of rails in this country from 1867 to 1880, in net tons:

Years.	Made in United States.	Imported.	Approximate Consumption.
		Iron. Steel.	
1867.....	459,108	163,042	622,150
1868.....	506,714	25,081	531,795
1869.....	593,586	313,163	906,749
1870.....	630,000	39,153	669,153
1871.....	765,733	56,908	822,641
1872.....	1,000,000	381,064	1,381,064
1873.....	863,077	99,401	962,478
1874.....	729,404	7,790	737,194
1875.....	617,209	15,274	632,483
1876.....	940,324	287	940,611
1877.....	766,709	none	766,709
1878.....	873,288	10	873,298
1879.....	1,000,000	26,017	1,026,017
1880.....	1,461,837	138,459	1,600,296

The figures of approximate consumption for 1880 are too high, although for the other years we think they are substantially correct. In 1880 we imported 132,459 net tons of iron rails and 153,230 tons of steel rails, all of which are counted in the approximate consumption of the year. But there re-

BROWN & BROTHERS,

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Railroad Car Axles. New and Old Rails.

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NEW AND OLD RAILS,

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Manufacturers of the Keystone Patent Solid

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These Shoes are made of superior iron and steel,

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have clip and solid steel calk. The holes are

punched through at the proper angles and free

from burrs. Same number of Shoes per keg as in

kegs of unfinished shoes.

mained in bonded warehouses at the close of 1880 no less than 39,912 net tons of iron rails and 38,379 net tons of steel rails, which should be deducted from the year's importations in estimating the consumption of the year. At the close of 1879 there were only 1820 net tons of iron rails in bond, and no steel rails. Deducting the iron and steel rails in bond at the close of 1880, we find the consumption of rails for the year to have been about 1,674,235 net tons.

PRODUCTS OF FORGES AND BLOOMARIES IN 1880.

As we have heretofore explained, blooms and billets from ore are made chiefly in the Champlain district of New York, and blooms from pig and scrap iron are made chiefly in Pennsylvania. The make of each product in the last eight years is given below, in net tons:

Years.	Products.			Total.
	Blooms and billets from ore.	Blooms from pig and scrap iron.		
1873.....	32,863	29,701		62,564
1874.....	30,450	25,222		55,672
1875.....	24,416	23,827		48,243
1876.....	29,784	23,844		53,628
1877.....	24,227	23,073		47,300
1878.....	24,139	23,000		47,139
1879.....	30,282	30,071		60,353
1880.....	40,658	33,937		74,595

THE IRON AND STEEL PRODUCTION OF ALLEGHENY COUNTY, PENNSYLVANIA.

The following table gives the production of iron and steel in Pittsburgh and the remainder of Allegheny County, Pennsylvania, in 1880 and the six preceding years, in net tons:

Year.	Number of iron rolling mills.	Product of iron rails, bar, angle, bolt, rod and hoop.	Product of sheet and plate.	Product of nails—kegs of 100 pounds.	Total rolled iron, including iron.
1874.....	31	224,114	52,351	562,095	838,560
1875.....	31	171,178	45,773	444,359	661,310
1876.....	31	189,511	31,488	538,874	759,873
1877.....	31	208,342	30,254	597,806	836,402
1878.....	31	226,687	33,425	444,013	704,125
1879.....	31	286,882	52,425	620,941	960,248
1880.....	30	287,253	80,899	419,098	787,250

Year.	Number of blast furnaces.	Make of pig iron.	Number of steel works.	Make of crucible steel ingots.	Make of all other steel, including Bessemer ingots.	Total make of steel.
1874.....	11	143,660	17*	17,915	6,000	167,575
1875.....	11	111,846	14*	22,948	15,408	151,202
1876.....	11	128,555	14*	25,009	54,457	208,025
1877.....	12	141,749	14*	24,747	89,401	270,907
1878.....	12	217,299	14*	27,460	106,048	350,807
1879.....	13	267,315	15*	40,148	130,781	438,244
1880.....	15	300,497	17*	52,135	169,819	522,451

* Bessemer steel included; four of these works are also iron rolling mills.

GRAND SUMMARY OF UNITED STATES STATISTICS FOR 1880.

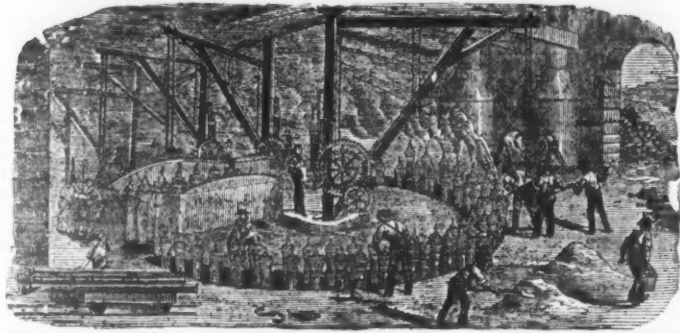
Production of pig iron in 1880, net tons.....	4,395,414
Production of spiegeleisen in 1880 (included in pig iron), net tons.....	19,603
Production of all rolled iron, including nails and excluding rails, in 1880, net tons.....	1,818,906
Production of Bessemer steel rails in 1880, net tons.....	954,450
Production of open-hearth steel rails in 1880, net tons.....	73,615
Production of iron and all other rails in 1880, net tons.....	1,028,065
Total production of rails in 1880, net tons.....	1,451,837
Production of iron and steel street rails in 1880 (included above), net tons.....	16,894
Production of cut nails and spikes in 1880, included in all rolled iron, kegs of 100 pounds.....	5,170,512
Production of crucible steel ingots in 1880, net tons.....	72,484
Production of open-hearth steel ingots in 1880, net tons.....	112,933
Production of Bessemer steel ingots in 1880, net tons.....	1,203,778
Production of blister and "patented" steel in 1880, net tons.....	8,465
Production of all kinds of steel in 1880, net tons.....	1,397,015
Production of blooms from ore and pig iron in 1880, net tons.....	74,359
Imports of iron and steel in 1880.....	880,483,365
Exports of iron and steel in 1880.....	12,990,095
Imports of iron ore in 1880, gross tons.....	423,408
Imports of steel blooms in 1880, net tons.....	65,000
Production of Lake Superior iron ore in 1880, gross tons.....	1,087,598
Shipments of iron ore in New Jersey in 1880, gross tons.....	845,000
Production of anthracite coal in 1880, gross tons.....	73,437,742
Production (estimated) of bituminous coal in 1880, gross tons.....	43,000,000
Miles of railway completed in 1880.....	7,174
Miles of railway in the United States, December 31, 1880.....	93,071
Miles of railway track in the United States, December 31, 1880 (estimated).....	115,649
Miles of railway track in the United States, December 31, 1880, laid with steel rails (estimated).....	33,680
Iron ships built in the United States in the fiscal year ended June 30, 1880.....	17
Imports of foreign merchandise into the United States in the fiscal year ended June 30, 1881.....	\$642,593,279
Total exports of merchandise out of the United States in the fiscal year ended June 30, 1881.....	\$902,310,471
Imports of specie into the United States in the fiscal year ended June 30, 1881.....	\$110,575,497
Total exports of specie out of the United States in the fiscal year ended June 30, 1881.....	\$19,406,847
Immigrants into the United States in the calendar year 1880.....	593,703
Immigrants into the United States in the fiscal year ended June 30, 1881 (estimated).....	668,000

A new exposition building, now being erected at Milwaukee, Wis., has a frontage on Fifth street of 400 feet, and on State street of 293 feet. The height of the main building is 89 feet, and of the dome 138 feet. The height of landing above dome is 145 feet, and to top of cupola roof 202 feet. The area of the ground floor is 87,000 square feet. In style the building may be described as Queen Anne, combining the picturesque qualities of the Gothic with the practical features of the classic. The estimated cost is \$125,000, and the time of completion September 1.

Beecher & Peck, of New Haven, are very busy on orders for drop presses and drop forgings. Among recent drop-press orders are two with four-ton anvils and one with a five-ton anvil.

A. H. McNEAL, BURLINGTON, N. J.

Flange Pipes.



General Foundry Work.

CAST IRON PIPES FOR WATER AND GAS.

ESTABLISHED IN 1848.

SINGER, NIMICK & CO., Limited, PITTSBURGH, PA.

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HAMMERED AND ROLLED

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Warranted Equal to any Produced.

BEST REFINED TOOL CAST STEEL

For Edge and Turning Tools, Taps, Dies, Drills, Punches, Shear-Knives, Cold-Chisels and Machinists' Tools generally.

SAW PLATES

For Circular, Mulley, Mill, Gang, Drag, Pit and Cross-Cut Saws.

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"Iron Center" Cast Plow Steel. Finished Rolling Plow Counters with Patent Screw Hubs attached.
"Soft Steel Center" Cast Plow Steel. Agricultural Steel cut to any pattern desired.
"Solid Soft Center" Cast Plow Steel. Steel Forgings made to order.

Represented at 59 Beekman St., New York, and 417 Commerce St., Philadelphia, by HOGAN & BURROWS, Gen'l Agents for Eastern and New England States.

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Tool, Machinery and Spring Steel
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This steel is specially prepared for steady cutting tools for work on hard metals, and is warranted to be superior to any special steel in the market for hardness, combined with toughness and ductility.

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SPECIAL
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ESTABLISHED 1847.

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For every kind of service, including Street, Mine and Lumber Trams. Wheels furnished in rough bored or on axles. Chilled castings made to order.

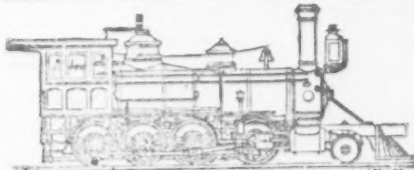
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Forgings for Piston Rods, Guide Bars, Wrist Pins and Machinery Purposes.

Works at Baldwin Station, Pennsylvania Railroad, near Harrisburg, Pa.

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LOCOMOTIVE ENGINES

of every Description.

Catalogues, photographs and estimates furnished on application of customers.

NOISELESS STEAM MOTORS,

For city and suburban Railways.

These machines are nearly noiseless in operation; show no smoke with the use of anthracite coal or coke as fuel, and show no steam whatever under ordinary conditions of service. They can be run at two or three times the speed of horse

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Manufacturers of and Dealers in

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Importer and Commission Merchant,

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NEW AND OLD STEEL AND IRON RAILS, STEEL RAIL BLOOMS, Bessemer and Spiegel Iron, Ferromanganese.

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For the Siemens-Martin and Crucible Steel Manufacture.

EXTRA SOFT CHARCOAL STEEL BLOOMS, BILLETS AND RODS FOR COLD RIVETS, &c. Superior Drill, Scythe, Tool and Die Steel Manufactured from Charcoal Iron, &c., &c.

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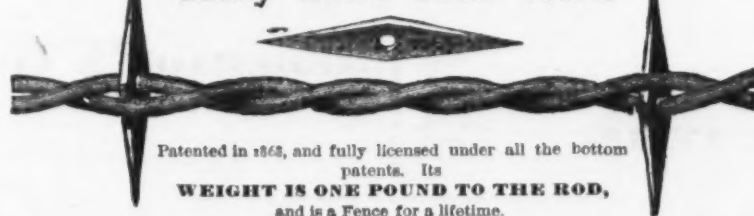
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Homogeneous Steel Boiler Plate, "Nashua" Brand. Best YORKSHIRE BAR, "TAYLOR" IRON, for Stamped Work, Screws, etc., etc. MUSHET SPECIAL TOOL STEEL, requires neither tempering nor hardening. Estimates given.

Kelly Steel Barb Wire.



Is adopted by railroads, by stock raisers and by farmers generally, on account of its superior style of barb, giving **STRENGTH AND LIGHTNESS**, and always holds its sharp point. In the

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a decision has been rendered sustaining all the Patents, and all manufacturers, dealers and users infringing will be held liable for damages. We do not sell to jobbers, but want one reliable retail dealer in each town.

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All shapes, small and large, including Gun, Pistol, Wrench Bars, &c. Also, Die Sinking. Manufacturers also of Bricklayers', Moulders', and Plasterers' Tools, Saddlers' Round and Head Knives.

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Manufacturers of

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BAR, BAND AND HOOP IRON,

T-RAILS AND SPLICE BARS.

Also, Street and Tram Rails.

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We solicit inquiries for Bar Iron and small Rails. Orders filled promptly.

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Patent Plain Back Solid Shovels and Spades, Back Strap Shovels, Spades and Scoops.

RAILROAD AND MINERS' SHOVELS of Superior Quality a Specialty.

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MANGANESE ORE.

84 per cent. Bk. Oxide.
59 per cent. Met. Manganese.
In quantities to suit purchasers, as per following analysis:
Sesqui Oxide Iron and Alumina..... 1.115
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Silica..... .353
Phosphoric Acid..... .397
Water..... 10.120
EQUVALENT TO
59.070 Metallic Manganese.
.143 Phosphorus.
The loss, 4 per cent., is Baryta.
For further particulars apply to

W. P. LOUCHRY,
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IRON CASTINGS to order.
Correspondence solicited.

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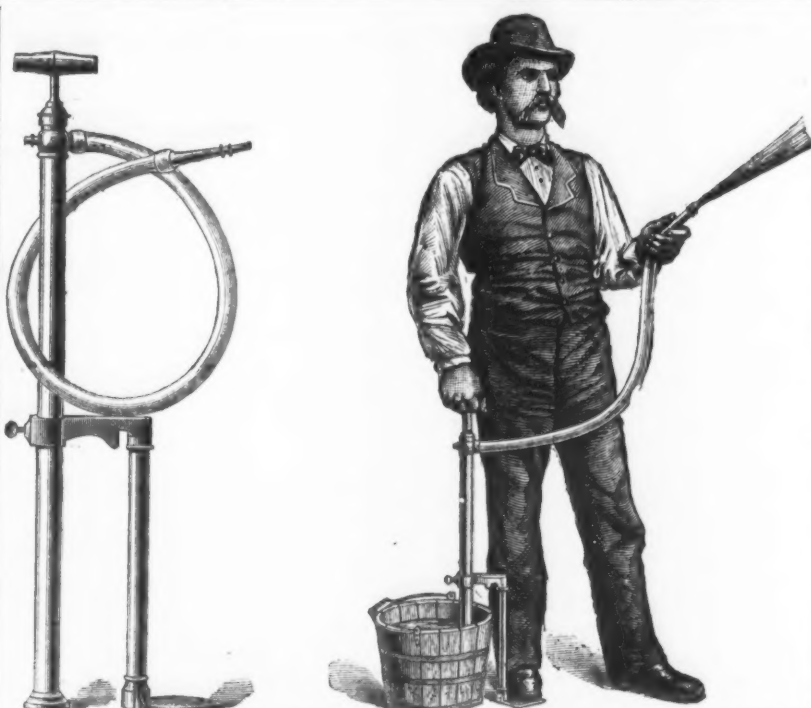
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THREE DIFFERENT
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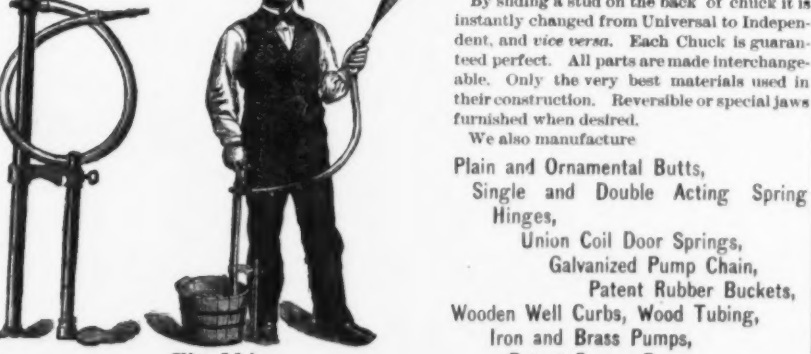
The above cuts (Fig. 259) represent our **PATENT AQUAPULT**, so valuable a Hand Force Pump that certain competitors have made bold to infringe on same, and even to resort to the crime of plagiarism in using our cuts and trade-mark name of article to decoy customers away from our manufacture and invention; and we caution the trade and customers against purchasing this article when not made by ourselves, as we intend to protect our rights under our patent.

WE ARE THE ORIGINAL AND FIRST INVENTORS OF THIS STYLE OF PUMP, AND HOLD VALID LETTERS PATENT ON SAME, AND ANY STATEMENT THAT IT HAD BEEN IN THE MARKET PREVIOUS TO OUR MANUFACTURE OF SAME IS OF COURSE ABSURD AND WITHOUT THE SLIGHTEST FOUNDATION IN TRUTH.

W. & B. DOUGLAS, Middletown, Conn.
BRANCH WAREHOUSES:
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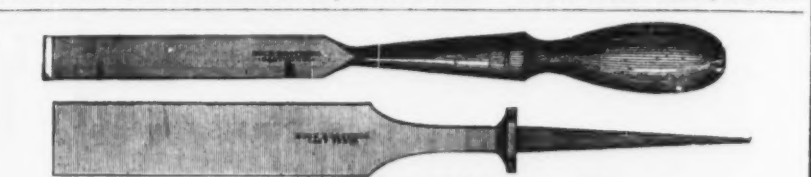
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Universal, Independent and Eccentric.
By sliding a stud on the back of chuck it is instantly changed from Universal to Independent, and vice versa. Each Chuck is guaranteed perfect. All parts are made interchangeable. Only the very best materials used in their construction. Reversible or special jaws furnished when desired.
We also manufacture
Plain and Ornamental Butts,
Single and Double Acting Spring Hinges,
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Wooden Well Curbs, Wood Tubing,
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BEST HAND FORCE PUMP IN MARKET.
Made of brass. Is very light, and works extremely easy. Write us for prices.

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BUCK BROTHERS, Millbury, Mass.
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CAUTION.—Buyers should be on their guard and not have inferior goods palmed on them by unprincipled persons, who represent them as our make. Our tools are stamped "BUCK BROTHERS," and our labels have on our trade-mark, also "Riverlin Works."

BRIDGEWATER IRON CO., Bridgewater, Mass. Manufacturers of **SEAMLESS DRAWN BRASS & COPPER TUBES,** **BRIDGEWATER HORSE NAILS, 3d. FINE NAILS,** **Tack Plates and Forgings of Every Description.** **NAHUM STETSON, Jr., Agent, 73 Pearl Street, New York.**

MAGNETIC IRON ORE. **THE ALL IRON MINES.** Capacity, 100,000 Tons per Annum.

These mines are situated in Putnam County, near Brewster, N. Y., and are in the vicinity of the "Tilly Forster" mine, which formerly belonged to the same parties.
These mines are now sufficiently developed to show a uniform quality of ore, the openings being a tunnel in the mountain of about 200 feet in length and 500 feet above tide-water level.
The following analysis of the ore was made by Prof. Thos. M. Drown, of Philadelphia, Pa.:

ANALYSIS.	
Mag. Oxide of Iron.....	75.66
Protoxide of Iron.....	8.83
Manganese Oxide.....	.09
Alumina.....	4.43
Lime.....	1.50
Magnesia.....	.07
Silica.....	14.89
Phosphoric Acid.....	.37
Sulphur.....	.48
Titanic acid.....	.07
Total.....	99.44

We propose to offer the above F. O. B. at Port Morris, N. Y., guaranteed 50 per cent. Metallic Iron.

J. H. CHEEVER, Treasurer,
38 Park Row, New York City. P. O. Box 2180.
W. E. RIDER, General Manager at Mines.
Brewster, Putnam County, N. Y.

The Latest Methods of Submarine Telegraph Work.*

This branch of engineering is of comparatively recent growth, and at first glance may seem hardly to be mechanical in its characteristics. The popular impression among those who devote any thought to it at all, is apt to be that it only involves the functions of the navigator and seaman. The real case is that only well-built and accurately working machinery, designed by the light of experience gained in all kinds of weather and over all varieties of ocean bed, writes successfully submarine telegraph work upon the list of engineering possibi-

don. The fundamental principle of the machine is elimination of friction of the sounding line, which is the great obstacle to the vertical descent of the weight, to receiving warning of the bottom having been reached and to the recovery of specimens of the ocean bed. So long as flax or hemp was used it was found that even when reduced to the smallest practicable dimensions, the point was speedily reached when the frictional resistance of its surface would neutralize the gravitation of the heaviest sinker, and that stratified currents swept the line in the most diversified and incalculable sinuosities. Even the ingenious devices of the late Lieut. Brooke, U. S. N.,

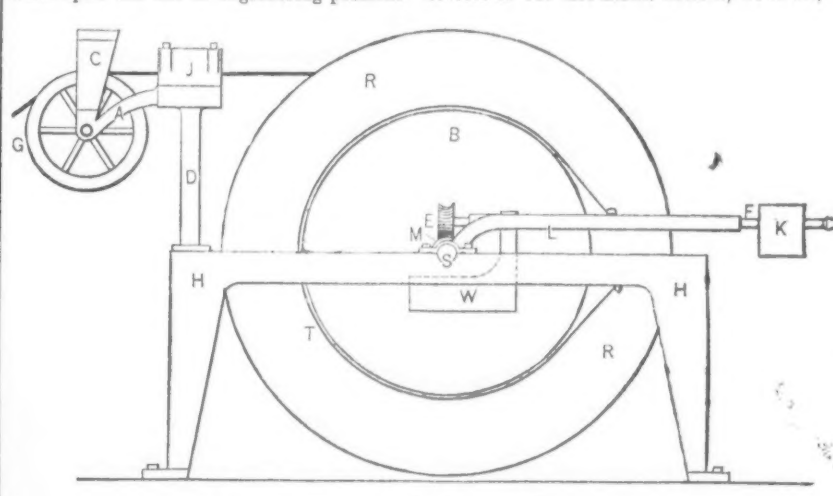


Fig. 1.—Side View of Sounding Machine.

ties. It is interesting to trace how entirely, from the first step, the prosperous conduct of an enterprise of this nature depends upon the perfection of the mechanical appliances employed in it. For example, the construction and laying of a submarine telegraph must be regarded from two points of view, viz.: As an engineering problem, the sagacious solution of which stimulates professional pride, and as a commercial question, whose satisfactory answer is the only justification of the time, money and labor devoted to the undertaking. About the most important factor in the financial success of a submarine telegraph is its capacity for business, or, in other terms, the number of words it can transmit in a given time. This fixes its revenue-producing power. Statistics show very distinctly the ratio between the foreign commerce of a people and the extent of its telegraphic correspondence, and this is the source from which must come the fund that shall cover the cost of maintenance, pay interest on the original investment, provide for complete renewal in twelve or fifteen years at the farthest, and afford satisfactory dividends to stockholders. All these considerations may be condensed into a single postulate, viz.: The capitalist knows that trade to a certain amount be-

for detaching the sinker when bottom was touched, thus sparing the line the strain of lifting it to the surface, fail to overcome this trouble; and the expedient of dispensing entirely with the line—as in the Morse bathometer, which sinks freely to the bottom, detaches its weight and returns to the surface by its own buoyancy, recording the pressure (and thus by inference the depth) it has been subjected to by the amount of mercury forced from one compressible vessel through a minute tube into an incompressible one—only introduced another embarrassment, as the distance and direction of the point of disappearance of the apparatus from the point of its reappearance was, owing to stratified currents, a matter of pure chance. Sir William Thomson secured comparative directness of descent by using small steel wire, which also reduced frictional resistance to a minimum, and obtained unmistakable and instantaneous notice of the bottom having been reached by keeping the sinker so nearly in equilibrium that the slightest arrest stopped the running out of the wire. This is accomplished by accurately balancing with brakes the weight of the wire paid out, and, as bodies following freely through water are found to very nearly describe equal spaces

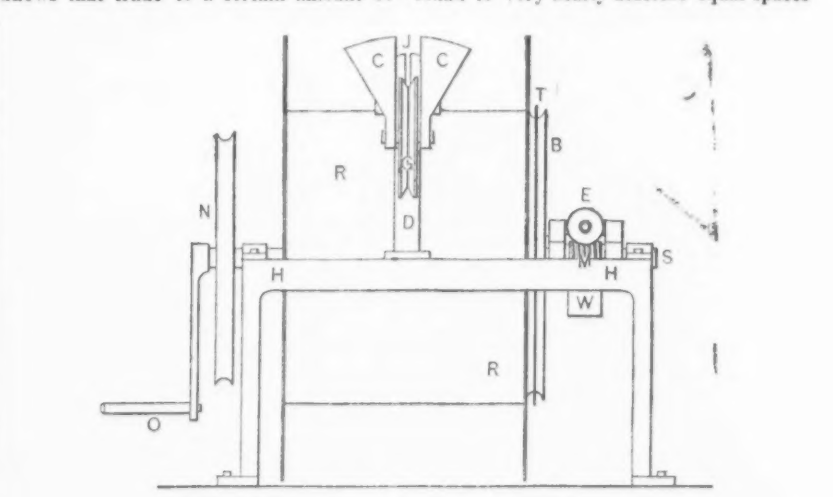


Fig. 2.—End View of Sounding Machine.

tween two countries means the interchange of so many words by telegraph, for which so much money will be paid.

The first duty of the engineer is to decide how great a capacity of transmission the submarine telegraph, more conveniently styled cable, may have. Rapidity of transmission means size; size means weight and bulk; these, in turn, imply ships of sufficient tonnage, and it becomes apparent that not a step in the enterprise can be safely taken until the proposed route be made the object of an exhaustive survey.

When the length of the longest uninterrupted circuit is known, and the greatest depth of water, the profile of the ocean bed and its chemical constitution along the projected course discovered, the engineer can predicate, with reasonable exactitude, how much shall be of a certain tensile resistance and how much of another, and whether or not any portion must be guarded from destructive action of the surface on which it will lie. These essentials to the durability being definitely decided, it becomes possible to indicate the largest insulated conductor which, in combination with the other constituents of a complete cable, the weight-carrying and storage capacity of the ships available for the work render permissible. The capitalist then may judge what the prospects of commercial success are. To arrive at this stage resort must be had to copious and accurate deep sea sounding, and thus, at the threshold of the enterprise, the need of mechanical appliances is felt, and it is fully met by the apparatus of Sir William Thomson, Professor of Engineering of the University of Glasgow. This instrument, devised as the recreation of a yachting cruise, is so infinitely superior to anything else of the kind as to put them out of court entirely. It has been materially, in detail, improved by Lieut. Cowder Jigabee, of the United States Navy, but perhaps has reached its fullest development in the form built and used by the I. R. G. P. & Tel. Co., of Lon-

in equal time, the sinker can do this undisturbed by any increase of weight from the wire paid out. The law here cited affords an excellent check for indicated soundings.

Figs. 1 and 2 show the essential features of the machine in question. They consist of frame bearing a galvanized-iron reel R, of steel sounding wire, removable at will from the shaft to which it is keyed. To one side of the reel is attached a grooved brake wheel, B, which is enveloped with a cord whose one end is secured to the frame and the other to the brake lever. The guide wheel G is a decided improvement upon the original machine, having an oscillating motion which permits it to tread in any direction, while paying out or reeling in, with perfect immunity. It and the reel are tangent to the same horizontal, allows a vibratory motion in the bearing at a right angle to the reel's plane of revolution without disturbing this relation. The wheel is counterbalanced (see C) with the least possible preponderance, to preserve its verticality, and yields so readily to the slightest pull of the wire that soundings to a depth of 50 fathoms may be taken from a vessel moving at a considerable speed.

The invention of the brake for balancing the weight of wire paid out is claimed by the author and operates in the following manner: Upon the shaft, S, which bears the reels, is a worm which engages with a gear wheel, G, keyed to the end of a long fine-threaded screw, F, and carried by the composite brake-lever shown in the appended sketch, Fig. 3. Revolution of the reel shaft either way causes this screw to turn, but without longitudinal motion in its supports. Riding upon this screw is a weight, W, made in the form of a hollow box for accurate adjustment, which is accomplished by putting in or taking out shot. It is so shaped as to allow of its coming directly beneath the brake fulcrum, or even passing beyond it and becoming neutral, or even of contrary effect if desired. The weight of the steel wire employed for sounding, which is No. 16 B. W. G. and of

* Paper by Mr. T. W. Roe, read before the American Society of Mechanical Engineers.

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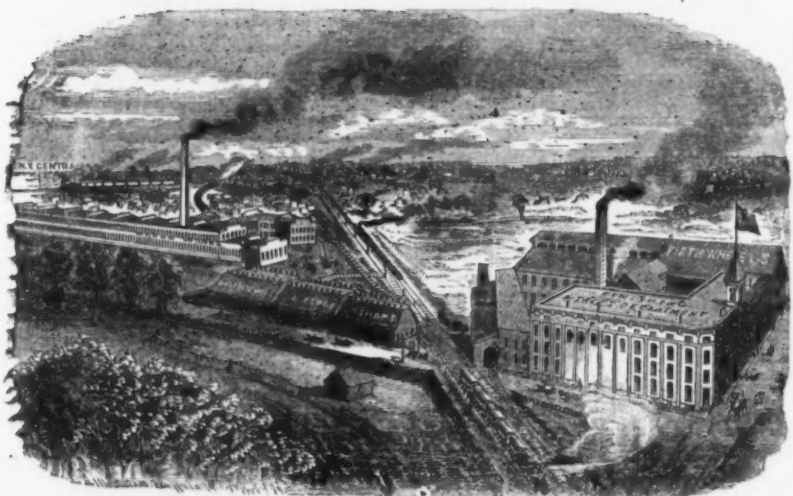
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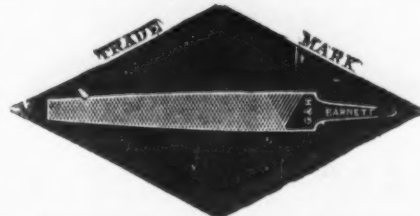
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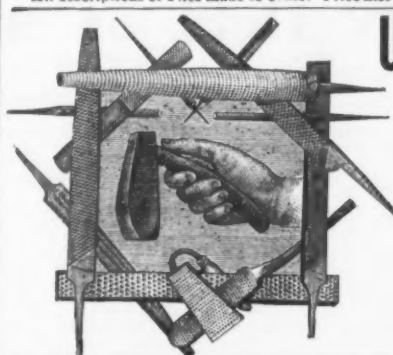
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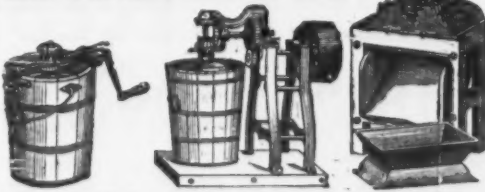
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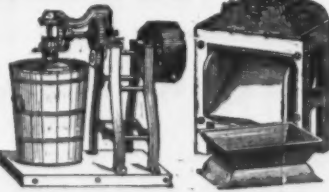
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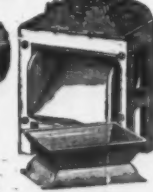
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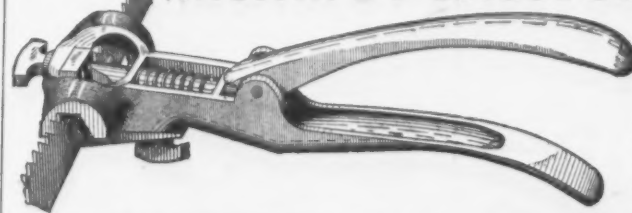
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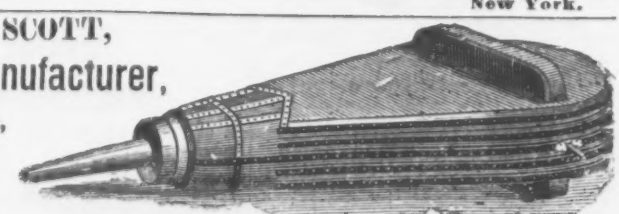
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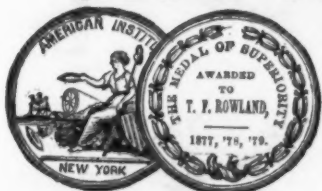
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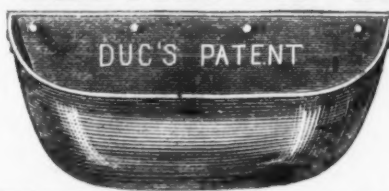
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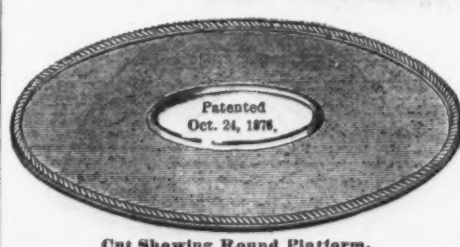
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the class prepared for piano makers on account of its exceptional tensile strength, is about 9 pounds per 100 fathoms when submerged, and the screw thread is cut and worm-wheel proportioned so as to cause the proper increase of brake leverage needed to exactly balance the regular increment of weight. Another weight, K, may be observed at the extremity of the brake lever, also capable of adjustment like the traveling weight. This is to balance the constant weight of the sinker. The method of procedure is to place the traveling weight in a neutral position, and, allowing the sinker (a spindle of cast iron of about 30 pounds weight, with a large enough long passage therein to allow of the specimen cup slipping through it when the sinker is detached) to depend from the reel and just submerged, to vary the fixed weight, K, until there is just preponderance enough to allow the reel to turn. The varying condition of the journals and lubrication of the machine render this adjustment necessary. The traveling weight preserves this condition very exactly, as the friction of the sounding wire is practically nil, and the slightest checking of the descent of the sinker

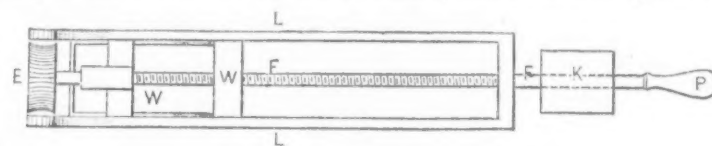


Fig. 3.—Top View of Brake Lever Shown in Fig. 1.

instantly stops the reel. A counter recording the revolutions of the wheel then gives the depth.

In Sir William Thomson's original apparatus the method of balancing the wire paid out by increasing the brake pressure was most elementary, being accomplished by hanging small weights of definite size upon the brake strap at regular intervals of time. There is nothing peculiar in the detaching device for the sinker on touching bottom, as it has not varied materially from the days of Berryman and Brooke, the naval hydrographers, but a very effective and inexpensive specimen cup has been added, consisting of a cylinder with its upper end closed, with the exception of one or two small perforations, and its lower covered with a diaphragm of rather stiff india rubber, slightly concave externally and crossed with two diametric cuts at right angles to each other. This perfectly meets the exigencies, which are to have a cup sufficiently mobile to open on touching soft ooze, and yet tight enough to prevent its contents being washed out in the ascent. The rapidity and accuracy of this machine is illustrated by a series of soundings taken between Marseilles and Algiers in September, 1879. The final route was across these zigzags, which were made for the purpose of ascertaining the inclination of the bottom athwart, as well as along, the line of the cable.

These average 1150 fathoms in depth and were taken in six days, during which the ship ran nearly 700 miles, and for one-third of the time continued work through a mistral in the Gulf of Lyons with no greater loss than about 7000 fathoms wire and some 25 sinkers and specimen cups. (It is necessary to say at this point that very good authorities prefer to recover the sounding weights at each cast, and this was the practice on the occasion in question.) Samples of bottom were obtained in all cases except two—exclusively the occasions when the wire broke. The reeling-in was performed by a deck engine connected to the apparatus by a rope belt. By old methods this work would have occupied a fortnight, while possessing none of the authority and precision of this. The method of preserving the sounding wire is to keep it in a bath of caustic soda, which preserves it bright and unoxidized for two or three years. Each reel of wire, containing 4000 or 5000 fathoms, is used for about 24 hours, and then returned to its bath and a fresh reel keyed to the shaft of the machine, which is contrived with a view to facilitating the operation as far as possible.

From the knowledge obtained with this most effective apparatus, the engineer may now prescribe intelligently the proportions of the cable and the quantities of the different types—that is, the heavy "shore end" in the vicinity of anchorages, and the "intermediate" for less exposed localities—and is competent to indicate where special precaution must be taken against chemical destruction of the cable armor by the ocean bed. This is usually accomplished by serving with jute and coating it with a mixture of tar and silica, which also defends it from marine insects, but it is found to be difficult to lay the cable with this covering intact. The discovery of some alloy, not so costly as to exclude it from the list of useful metals, that should show a rate of oxidation notably less than that of iron, yet possessing all its tensile strength and ductility, would be the touchstone to commercial success in submarine telegraphy. The conductivity and insulation of submarine wires is all that can be desired, and once safely laid are indestructible while the armor lasts, but this failing through corrosion, currents and marine insects work their will on the delicate conductor, which of itself is too weak to be lifted to the surface for repair. Hence it is a canon of submarine telegraph finance that provision must be made for complete renewal about every twelve years.

The constructing of a profile of the ocean bed from these soundings by the easiest method is too familiar a process to be noticed here, but recent experience has established the wisdom of plotting it with a common vertical and horizontal scale, for the following reason. Of course this demands something very like an old-fashioned panorama to be at all manageable, but it is not difficult to devise. Cross-section paper of the proper scale can be procured of any length, and by attaching a common drawing board to a standard bearing rollers at each end, with crank handles, the lengthy diagram can be conveniently used on rolling it by one crank and rolling it up with the other, the point over which the ship chances to be can always be kept on the drawing board.

The use and convenience of this is readily illustrated. It is frequently noticed, in laying a telegraph cable, that the velocity with

which it leaves the vessel varies decidedly without corresponding change of the ship's speed, rendering necessary perpetual adjustment of brake power to preserve the ratio of "slack," as is termed that excess over the linear distance which is needed to insure the cables touching ground throughout its path over submarine hills and dells which the situation prescribes. It is distasteful to the engineer to waste valuable cable, yet if the depth is increasing rapidly it is imperative that the percentum of slack be augmented, and vice versa. The position of the ship may be readily computed at any moment, but the depth of water at that point by no means measures that at which the cable is taking ground. This, in a depth of 2000 fathoms, with the ship moving at six knots per hour, may be four miles astern, and is that to which fluctuations in the speed of the outgoing cable are due. Now, the fact already cited, that bodies sinking in water assume, after the first two or three seconds, a uniform downward velocity, the direction of a cable between ship and bottom, while being laid, is approximately a straight line, and an empirical formula given by Latimer, Clarke and Helming Jenkin renders

it possible to calculate the angle it makes with the surface for any given cable. If, then, a bevel gauge of suitable dimensions be set at the angle proper to the cable in question, the engineer, by applying it to the true scale profile, already described, easily finds the vertical component of the stress which he must control with his brakes. The bevel gauge cuts the ship's position on the surface, and the sounding over the point where it cuts the bottom measures the downward pull of the cable at the ship's stern. So then when the outgoing cable gathers speed, while the ship maintains a steady pace, and there is a doubt whether or no the brakes are not becoming polished and greater force should be applied to them, or, on the contrary, when it passes overboard at slackening rate, and the fear arises that dry brakes or heating journals may be the cause, a recourse to the bevel gauge and profile will show indubitably that the cable is taking ground later or earlier, and the necessary measures may be taken.

At this point it seems proper to make an apparatus which, in combination with the device just described, enables the percentum of slack to be regulated much more accurately than could be done by former methods, even with the closest personal supervision of the engineer, whom it relieves of this most exacting and onerous demand upon his attention. The old routine was to order the man stationed at the dynamometer to keep a definite strain upon the outgoing cable, which the judgment of the engineer decided to be the proper one to maintain a uniform rate between its speed and that of the ship. The revolutions of the brake-drum were taken at regular intervals, more or less close, and compared with the reading of the log, and with a result rarely very satisfactory. The difficulty also of keeping the prescribed strain upon the cable was very great in all except the calmest weather. The new instrument, called the strophometer, consists of a dial in full sight of the man stationed at the dynamometer, connected by a driving belt or cord with the brake-drum, the number of whose revolutions per minute are indicated by the pointer, and evidence of its working given by the sounding of a small bell at each revolution. The normal ship's speed being about 100 fathoms per minute, and the circumference of the average brake-drum about three fathoms, the calculation of slack becomes a question of revolutions, which the dynamometer watch can easily maintain as ordered, with the strophometer appealing instantly to his eye and ear by means of the jockeying which experience teaches him.

One simple but most important change in the paying out machinery is that in what is termed the "holding-back gear," otherwise it has only differed in detail from that which Everett designed for the "Ninara" when he assisted at laying the first Atlantic cable. The submerged cable is controlled entirely by the adhesion of several turns of it about a strong drum, keyed to the same shaft that carries one or more heavy, wide-faced wheels, against whose circumference wooden blocks are pressed by a belt, which is drawn tight by weights acting through levers; the details are presented here. A necessary adjunct to this was something to keep a slight pull upon the cable as it took the drum, that the full benefit of its adhesion might be insured. This was compassed by letting pass over the cable V-shaped grooves, in the peripheries of wheels whose axes also carried brake wheels, of which the tension could be regulated at will. Other weighted wheels, called "jockeys," rode upon the cable, crowding it into the wedge-shaped channel, thus securing the necessary adhesion. Adjustment of these small brakes gave the moderate pull required for this purpose, but it was discovered that in a seaway they became a source of danger. As the stern of the ship settled in the trough of the sea, the brake drum would come nearly to a standstill; then rising with the next wave would cause it to revolve with extreme rapidity, imparting this motion to the holding-back gear, whose momentum lasted until after the next slackening of the brake-drum, thus causing the cable to pass to it loosely, to the great danger of over-riding or rendering upon it. The substitute for this passing the cable between alternate quadrants, adjustable upon a horizontal bed-plate, and it meets every requirement.

The method of landing cable ends from ships depends largely upon the region in which it takes place, but the method adopted by the I. G. P. & Tel. Co., of London, is of almost universal application and worthy of notice. This portion of the work is always done first, the heavy shore-end cable and intermediate type being put down at both termini, and buoyed, usually with a strong grappling rope, in a depth of water

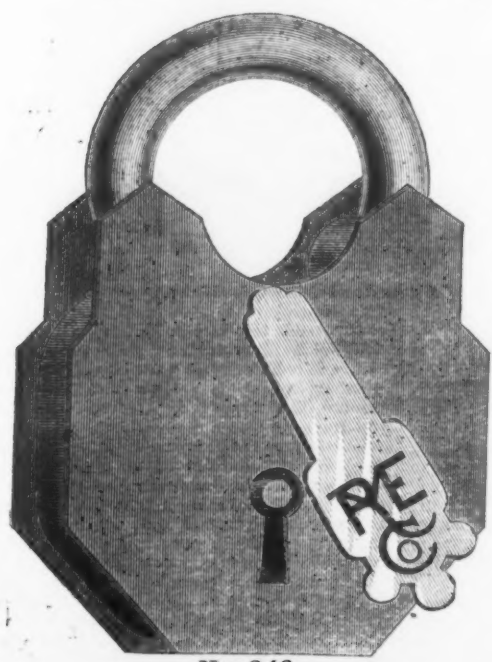
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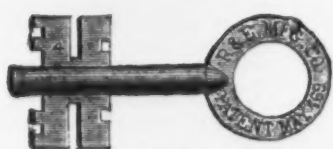
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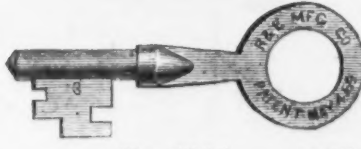
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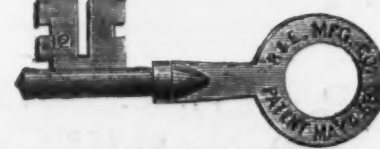
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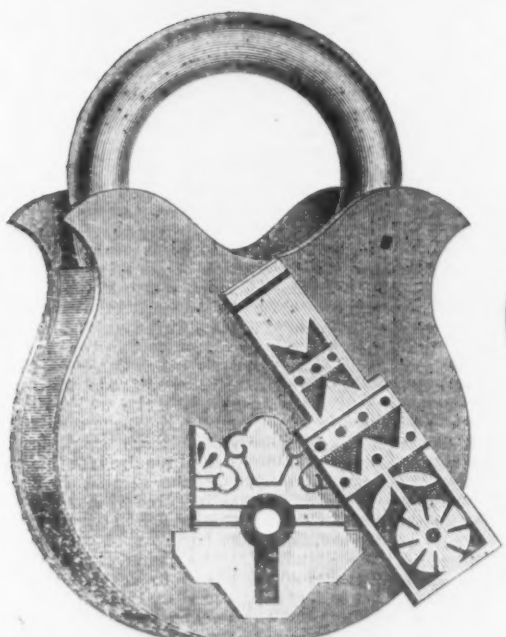
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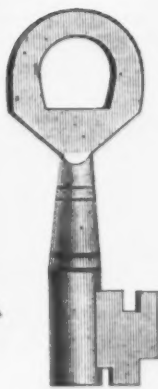
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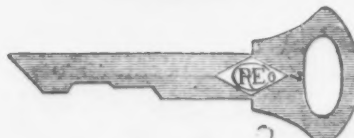
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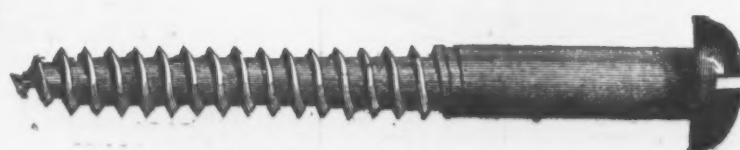
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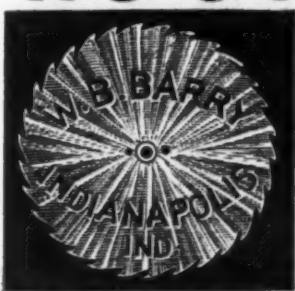
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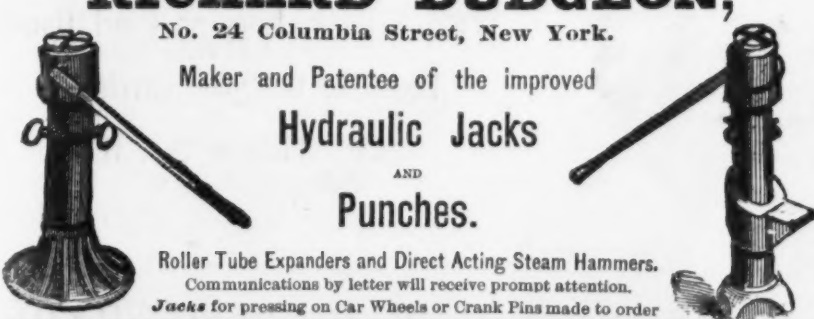
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into which the cable ship may safely run. She then splices on the deep-sea type at one buoy and runs for the other. The ship approaches the land as near as safety warrants, and, having anchored, sends ashore a large spider wheel, so called, and one or more mushroom anchors. These are buried to a suitable depth, and the spider wheel secured to them in such a manner as to revolve freely. A line is then passed out over the sheave at the ship's bow, carried ashore in boats, rove through the spider wheel, and its end brought back to the ship's stern, where it is made fast to the cable depending from the stern sheave. The powerful picking-up machine in the fore part of the ship now begins heaving in on the line, and, as it comes aboard, cable is paid out at the stern of the ship. (The sketch, Fig. 4, shows the entire operation.)

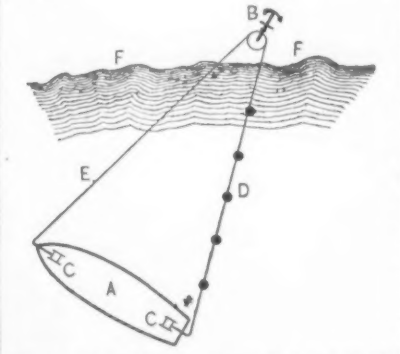


Fig. 4.—Sounding the Shore End of a Cable.

It is necessary to sustain the weight of the cable paid out, and this is effected by attaching barrels to it at definite intervals as it goes overboard. While perfectly effective, these are clumsy to handle and most cumbersome on shipboard, and the author substituted for them, at the laying of the Marseilles-Algiers cable of 1879, india rubber spheres of 3 feet diameter, inflated by a small air-pump when needed. These answered every purpose, were most convenient of manipulation and were capable of the most compact stowage. This operation can be easily carried on at the distance of a mile from shore, and possibly further.

The introduction of the electric light is all that remains to be adverted to. This might seem unworthy of notice to one who had not undergone the wearing anxiety of night-work on a stormy sea in laying submarine telegraphs. The exhausting influence of hour after hour of intense watchfulness, with every sense strained to make good the handicapped eyesight and catch timely warning of aught amiss with the cable tanks, the intricate assemblage of deck machinery and the elusive indications of the electrical test room, is something that must be experienced to be appreciated. The flood of light poured over the deck by electricity lifts half the burden.

The preceding résumé has adhered strictly to its title, being little more than a recital of improvements in the methods of submarine telegraph engineering that have been taught by the experience of recent years. The essentials differ little, if at all, from those adopted in the youth of such enterprises, and is only another proof that the daring spirits who tied continents together beneath the astonished sea, did not win success by a happy chance. It was faith, patience, pluck, close thought and hard work, which never fail of their reward. The direction in which further improvement must be sought is with cables themselves, and not with the methods of constructing, building or laying them. Durability is the great lack, and the promoter of this, in even a limited degree, cannot fail of a noble reward.

Marvels in Electricity.

A correspondent of the *Parisian* thus describes some of the notable features of the Paris Exhibition of Electrical Apparatus, now in progress:

The immense nave of the Palais de l'Industrie is filled with all important material of electric science. It may be reached by a small electric railway, on the Siemens system, starting from the Chevaux de Marly, on the Place de la Concorde, and entering the palace near the Pavillon de l'Horloge. The road runs parallel with the avenue, and drops its passengers in the centre of the building. The trains consist of two saloon carriages, of the usual dimensions, and a small electric motor, which takes from the rails the fluid supplied by generators at the end of the line. In the nave is a small pond, several square meters in area, in which a miniature steamer will lay a miniature submarine cable on the Colas system. In the basement of the building will be illustrated all varieties of such cable and wire manufacture, adjoining, but not forming part of the official part of the exhibition, which will comprise all forms of governmental electric apparatus, manipulators, receivers, piles, telegraph posts, isolators, switches, and a thousand other matters of necessary detail in the complicated system of commercial or military telegraphy. Towering above the whole nave is an immense light-house, the perfected result of the Serrin system, the style adopted by the State of La Hève, and to be employed in the constructions planned by M. de Freycinet.

By daylight the spectator may watch the operations of a whole army of telegraphists, machinists, and other electric specialists, each in his own niche, while at night this swarm of operators and motors is lighted by the blaze of a thousand electric lights streaming from the roof—a grand composite of all known systems—Jablochkoff, Werdermann, Jamini, Siemens, Gramme, Lontin, Noailion, Meritens, Suisse, Wilde, Brush, Swan, Edison, Maxim, Arnaud, Crompton, Brodie, &c.—some in globes, others diffused by enormous Balesirri reflectors. Force is supplied by magnetic and dynamo-electric generators amounting to 1500-horse power. The Pavilion of the city of Paris is adorned as for an art exhibition. Statues and hangings are replaced by fire alarms, electric dials, municipal and police calls, &c. From these rivals of the government are the five

great railway companies, with their systems for stoppage and signaling, their electric brakes, train registers, calls and alarms, besides a singular carriage, at work on the Eastern Line, and invented by Messrs. Deprez & Napoli, for observing the running of trains, and registering velocity, traction, force of wind, consumption of steam, &c. The basement region offers also the surprising and novel results obtained by the recent labors of Messrs. Cabanellas, Hospitalier and Deprez, in the matter of electric division, transportation and distribution, a department in which the French school has been successful.

So much for the basement, the region of science and practical utility. The upper story has been devoted by the chief Commissioner to scientific curiosities and fanciful inventions for the delectation of the curious but untechnical observer. Two telephonic auditoriums have been arranged to connect, one with the Opéra and the other with the Théâtre Français, richly furnished, and supplied with some 50 telephones each, where the auditor, calmly seated in his arm chair, may listen to the sonorous recitative of M. Villaret, or the bright dialogue of Croizette and Coquelin. In adjoining rooms the visitors may talk through the Hera telephones with distinct cities like Lyons, Orleans, Dijon, or a dozen others. Next comes a series of eight rooms, literal copies of a Parisian apartment of the present day, where everything will be, so to speak, run by electricity. The kitchen is to be lighted by electric lamps; the range heated by electric currents passing through water; a half-dozen electric cooks, by means of incandescent platinum wires, turn out "electric waffles," and electrically heated metallic plates serve for braziers and chafing dishes. The dining room is fitted out with all the wondrous new apparatus which already threatens our peaceful firesides with its novel blending of science and comfort. The central sunlight, in place of a chandelier, may be lighted by the pressure of a button or the opening of a door. The dishes will be brought up on an electric dumb waiter; doctors, errand-boys, firemen and servants can be summoned by the familiar New York system of dials and calls. The only thing left to do would seem to be to eat by electricity, and, in view of the wonders accomplished, even that seems not so very improbable.

The third room—the parlor—is furnished with electric chandeliers, mantel clocks going by electricity and adorned with electrical groups and figures, telephonic speaking tubes and electric fire-places. In the billiard room adjoining, an electrical billiard table enables the player, if not to make his caroms, at least to mark them by an electrical indicator. It would be a pleasant policy to add to these rooms an electric chair for the extinction of the persistent bore. You take the idea? Your bore is comfortably seated, smoking and talking you to death. A light touch on a knob. Crack! your bore is wrung with internal convulsions and set upright on his legs. *Exit ex necessitate.* Seriously, however, the parlor has an electric piano to be played by "some other fellow" at a distance, and having a Carpenter telegraph to make electric record of improvisations. The bed room, besides all sorts of electric calls, has on the toilet table a set of electric brushes. You turn a commutator, offer your head to the gentle caresses of the brushes, and your hair is brushed—if you have any. The series of rooms closes with a family theatre—stage, auditorium, flats and all—lighted by the Werdermann electric lamp, which allows the footlights to be instantaneously raised or lowered, filling the room with a blaze of illumination or leaving it in total darkness at will. In this pleasant room noted Parisian musical artists will give concerts, to more completely electrify the audience. Finally, a room is devoted to electric views, projections and toys; miniature telegraphic apparatus, trick boxes, magic lanterns, railways, telephones, dolls and automata, for the amusement of Parisian youth and their elders as well.

One of the important industrial inventions which Americans have been sent is the electric middlings purifier, the most perfect method known of separating the bran from the middlings. This is usually done by air blast, which blows out the bran. The defects of this system are that much of the fine flour is blown away, and the mill is filled with the fine dust that sometimes causes an explosion. Mr. Kingsland Smith, an American miller, first devised an electrical separator. When a bit of hard rubber is rubbed with a brush it will attract any light substances, such as bran or bits of paper. In the electrical separator the grain is passed under a series of rubber rollers, which attract all the bran and allow the grain to fall into proper channels. One machine which purifies 50 barrels of middlings a day requires so little power that a man can work it with one hand. The electric buoy, an American invention, is also exhibited. The action of the waves keeps up a current of electricity strong enough to produce light. Railroad brakes are shown in which, upon turning a key, the movement of the wheels operates upon a series of dynamo machines which cause magnets to clamp the axles. In this way no steam power is wasted, the motion of the train stopping it. Among the most prominent features of Mr. Edison's display are: Electric lighting exhibit, 125-horse-power steam dynamo and several dynamos of less power, one 5-horse-power, and several motors of less power, 2000 electric lamps with specially prepared fixtures, and complete appliances for regulating the current, for guarding against fire and for insuring absolute trustworthiness of light at all times, and a large number of machines for demonstrating every detail of a complete system of electric lighting. Mr. Edison has somewhat improved his lamp since last winter. Then a 1-horse-power machine fed seven lamps, each of which burned for four months. Now, the same machine supplies nine lamps, each of which will burn for seven months. The size of the carbon has been reduced one-fifth without impairing the perfection of the filament. This part of his exhibition of the uses of electricity, Mr. Edison thinks, will be particularly interesting to Parisians, inasmuch as he has secured a license from the municipality of Paris to light up one section of

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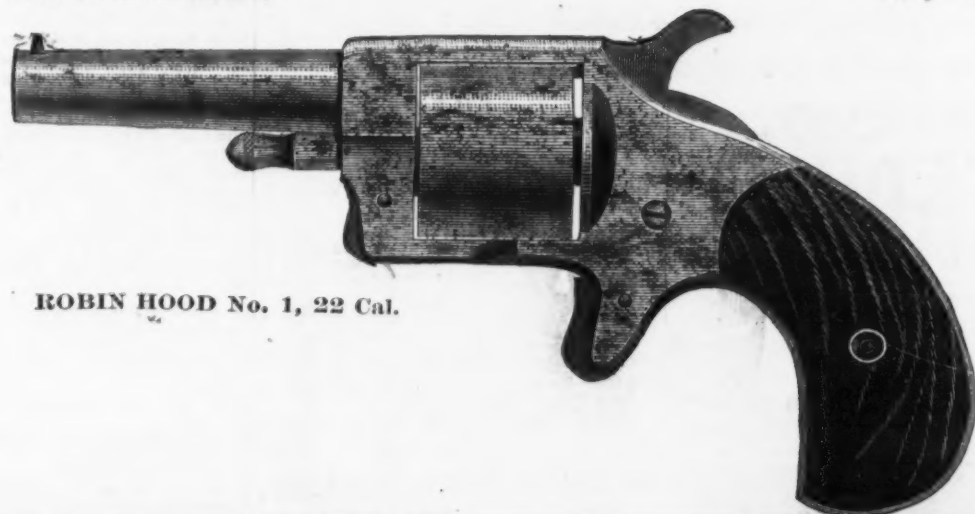
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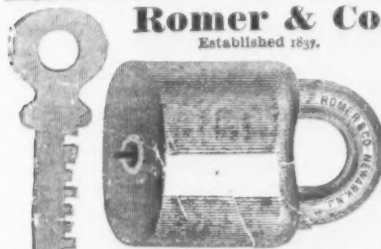
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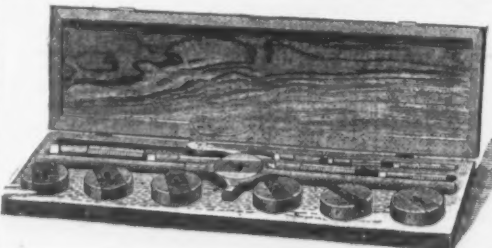


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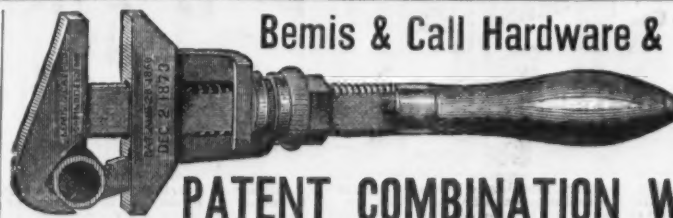
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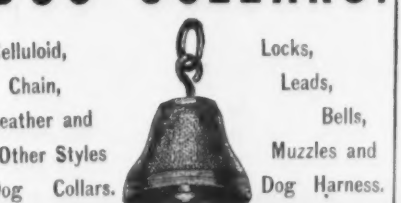
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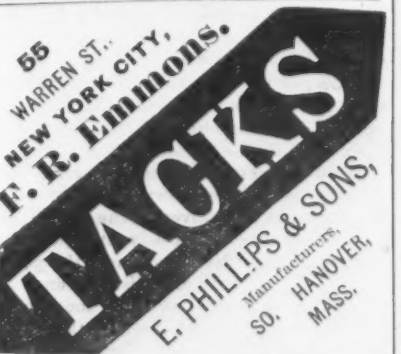
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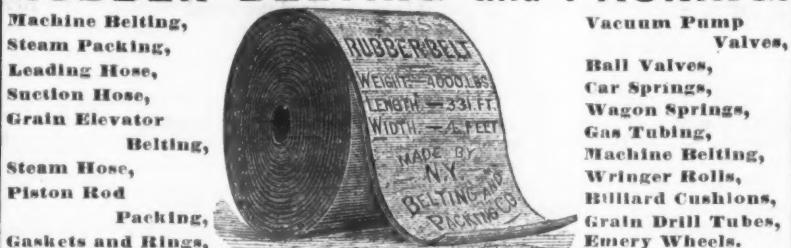
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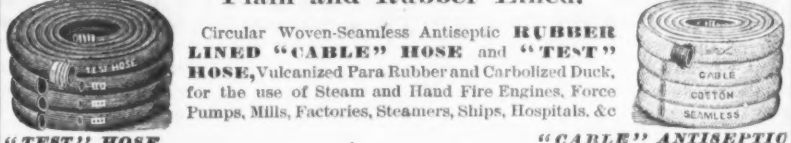
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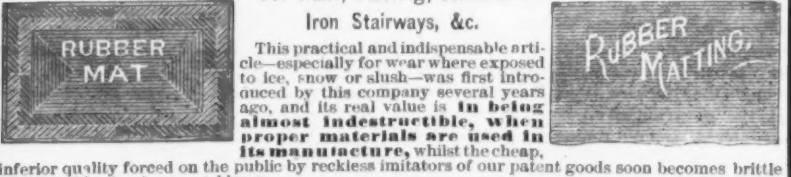


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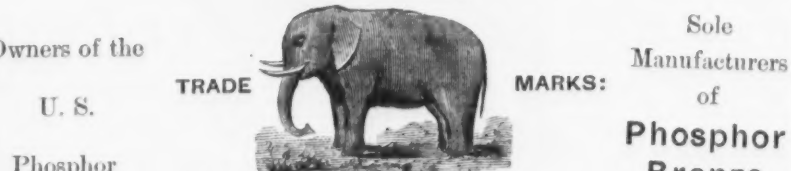
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the city, and he thinks that he will be en-
abled from this exhibition to form a company
for the lighting of the whole city.

In the other departments of the exhibition
of the application of electricity Mr. Edison's
skill is well displayed. A complete telegraph
system may be seen in his show-rooms. The
automatic (Morse), the automatic Roman
letter and the autographic systems will be
fully demonstrated. Mr. Edison thinks the
autographic system will at some future day
astonish the world, when it can be further
developed. At present this system will re-
produce in Philadelphia a fac-simile of the
handwriting of a message in New York.
Besides these, in the telegraphic department
the duplex and quadruplex instruments now
in common use in New York are exhibited.
A number of telephones are also included in
the list, including the carbon telephone, the
mograph telephone, the mograph musical
telephone, the telephone recorder (which
is the telephone and phonograph combined),
and a multitude of telephones of different
constructions and principles. Among the
miscellaneous articles are a pressure relay
and mograph relay in the telegraphic ex-
hibit, a tasimeter, a carbon rheostat, a
mograph battery, an exhibition of the ap-
plication of the electric force, a number of
phonographs and megaphones, and a large
number of electric lamps, showing the vari-
ous stages of the development of the electric
light from the first platinum lamp to the
present improved carbon lamp; practical
illustrations of the use of electricity as a
motive power, a complete system of under-
ground street tubes, mains and feeders, for
the purpose of lighting up sections of cities,
and an ore-milling apparatus which will be
operated by the use of the electric current.

Old Styles of Weapons.

It is amusing to read of the early Euro-
pean cannon, to say nothing of the wooden
cannon of China. At the siege of Constan-
tinople, in 1413, was used a cannon with a
4-foot bore, that cast a stone missile weigh-
ing 600 pounds. In the arsenal of Venice is
a large mortar composed of several thick-
nesses of coiled hempen rope, covered with
a thick casing of leather. This weapon was
captured from the Turks, and fired a shell
18 inches in diameter. Mortars composed
of paper, with an outside covering of leather,
are preserved in the arsenal at Malta. They
were probably of Eastern manufacture, and
used during the Crusades or earlier. Early
European cannon were of wrought iron, and
loaded at the breech, and had a greater
thickness of metal at the muzzle than any-
where else, with the idea of preventing the
muzzle from jumping up at the moment of
discharge. The honor of successfully apply-
ing the explosive shell to firearms is due to
the Netherlands, but their shells required
"double ignition"—that is, first a lighting of
the fuse which fired the explosive charge of
the shell, and then a firing of the mortar
charge, the delightful result of which was
that not a few shells burst in their mortars
whenever the mortar charge happened to
miss fire. The Germans invented the single
ignition bomb.

The early hand firearms were hardly a
success, because in 1585 Montaigne wrote
that the effect of firearms, apart from the
shock caused by the report, to which one
does not get easily accustomed, was so in-
significant that he hoped they would be dis-
carded. In those days the hand culverin,
of which the Swiss army had 6000 at the
battle of Morat, required two men to han-
dle it. It was fired from a fork or rest,
which also served as a ramrod. One man
leveled and held the weapon during dis-
charge and a companion applied the prim-
ing and the match, and assisted in loading
and carrying the weapon. Peculiar weap-
ons, introduced in the first part of the fif-
teenth century, were the club pistol, the
pistol battle-axe and the holy-water sprinkler
—all intended for horseback use. All the
early firearms were slow to load. At the
battle of Kuisyngen, in 1636, the slowest
soldiers managed to fire only seven shots
during eight hours. A quicker mode of ig-
nition was required, and this developed the
arquebuse, or matchlock, which carried a
match in the "serpenter" or hammer, and
had a slow match continually burning in a
holder on the top of the barrel. The
wheel-lock was a late idea, and was in-
vented at Nuremberg in 1515. Rifles were
possibly invented as early as 1440, but the
grooving would seem to have been parallel
with the axis of the bore. Spiral grooves
were first introduced by Gaspar Kollner, of
Vienna, in 1498, but it was not till the seven-
teenth century that the rifle became a mili-
tary arm on the Continent, and its intro-
duction in England did not take place till
nearly a century later.

Deaths from Industrial Pursuits.
Some startling facts respecting the amount
of sickness and death which result directly
from the circumstances under which indus-
trial pursuits are carried on, have lately
been discovered in England, where they
have been brought to the attention of the
authorities as a subject worthy of investiga-
tion with a view of amelioration. One
statistician who compiled tables on this sub-
ject in 1877, giving the records of deaths
and injuries by steam boilers, in mines, on
railways and in factories, estimated the
mortality in England from these causes,
during the four years preceding 1877, at a
total of 107,000 men, women and children;
and he estimated, on the basis of these facts,
that 500,000 workmen will lose their lives
during the 10 years from 1877 to 1886, from
the following causes, namely: 300,000 in
mines, 70,000 on railways and 130,000 in
factories. Another writer on the same sub-
ject, criticising these figures, thinks they
are altogether too small, and that the acci-
dents reported comprise only a small part of
those that actually take place. He is of
opinion that not less than 100,000 persons
are annually killed in England from causes
directly resulting from the industrial occu-
pations in which they are engaged. These
statements, which are doubtless based on
reasonably accurate data, are sufficiently
appalling to arouse from its traditional *sang
froid* even so inert and conservative a body
as the British House of Lords. Taking even
the lowest estimate of mortality from indus-

trial accidents as the safest basis for estimat-
ing the number of yearly deaths from such
causes the world over, and it will be found
that the "horrors" of war, with its reckless
sacrifice of human lives, become far less
horrible when a comparison of the number
of victims is instituted.

The Manufacture of Lacquer in Japan.

Sir E. J. Reed, after a visit to Japan,
describes the method of making lacquer in
that country as follows:
The Japanese lacquer is laid usually upon
articles of wood, and not upon articles of
papier-maché, as many suppose. It is pro-
duced from the sap of the *Rhus vernicifera*,
which is taken in its natural state into a
large wooden tub or vat, and then stirred in
the sun with a large spatula, until its excess
of water is evaporated. In some cases the
varnish so produced undergoes careful strain-
ing; in others, it is mixed with sulphate of
iron, with vermilion, with red oxide of iron,
or with indigo; oil is sometimes employed,
likewise powdered stone. Into some inferior
varnishes, a sort of paste made of rice enters
in considerable proportion. There are a
dozen methods of employing the various
varnishes, differing according to the nature
of the object to be produced. In the best
lacquer, numerous coatings are applied, dried
and polished successively. The first polish-
ings are done with a stone named *tsu shinada*
(suitable for hones), the latter by means of
water, and a charcoal made from *Auroneoda
ocatifolia*, and the last with pulverized stag's
horn. All the polishings are effected by the
hand. When gold is used in smooth-surface
lacquers, where it is not to be in relief, the
process is as follows: The design to be pro-
duced is traced on a leaf of paper, which is
then reversed, and has repeated upon the
opposite side of it the outlines and other
features of the design, in a mixture of
varnish and vermilion, softened over a mild
fire. This side of the paper is then ap-
plied to the lacquer to be decorated, and the
paper is rubbed and pressed upon it by
means of a small spatula of bamboo. The
transfer of the pattern from the paper to the
lacquered surface is further assisted by gently
beating the paper down with a small silken
bag, containing powdered stone. The paper
is then peeled off, and can be used again if de-
sired. The slight relief of the pattern so pro-
duced upon the lacquer is rubbed down with
carbon polish, and the design, and that alone,
is then lightly covered with a thin layer of
quickly-drying varnish. Gold, in powder, is
then applied to the moist surface by means
of a camel-hair pencil if the gold powder be
fine, and by means of a small tube if it be
comparatively coarse and heavy. The article
is then dried for a day in a warm closet,
such as is used for drying the ordinary
lacquer varnish. The design is next lightly
coated with a very thin layer of varnish,
applied by means of paper steeped in it and
passed very delicately over the object, which
is then redried in a closet. The object re-
ceives further extremely light coatings of
varnish and subsequent polishings before it
is completed. Silver is applied in powder in
the same manner. When gold or silver is
applied to designs in relief, the details of the
process vary considerably, but the applica-
tion of the metals is effected in substantial-
ly the same manner. When gold or silver are
applied in leaf, they are laid upon the var-
nished surface prepared for them, and dealt
with in the usual manner, the varnish acting
as a "size" for the metallic leaf. When
mother-of-pearl is used as an incrustation
for lacquer, it is laid on during the varnish-
ing processes, earlier if it be thick than if it
be thin, and the final polishing is proceeded
with until the pearl is brought to the surface.

From returns gathered by Ryland's *Iron
Trade Circular*, the position of the blast fur-
naces in Great Britain on June 30, as compared
with March 31, is as follows:

Where Situated.	Furnaces built.		Furnaces in blast.	
	March 31, 1881.	June 30, 1881.	March 31, 1881.	June 30, 1881.
England:				
Cumberland	54	54	42	39
Derbyshire	57	57	40	37
Durham	60	60	26	24
Gloucestershire	9	9	8	8
Hampshire	1	1	0	0
Lincolnshire	15	18	16	13
Leicestershire	49	49	30	28
Northamptonshire	25	25	15	12
Northumberland	4	4	4	4
Staffordshire, South	146	144	44	43
Staffordshire, North	36	37	22	21
Somersetshire	1	1	1	1
Shropshire	25	25	11	9
Wiltshire	7	7	3	3
Yorkshire, W. Riding	49	49	31	25
Yorkshire, N. Riding	101	104	98	99
Wales:				
North	10	10	5	4
South	251	152	71	63
Scotland	153	149	120	119
Total	954	951	575	542

The decrease of 33 furnaces is entirely in the
Midland and Welsh districts, Scotland and the
North of England continuing their large out-
put.

In his address at the recent meeting of
the Institution of Mechanical Engineers, the
president, Mr. A. E. Cowper, stated that
Joy's valve motion has done good work on a
locomotive. Mr. Webb reports as follows
in regard to it: "The engine has been at
continuous work ever since the Barrow
meeting, and has run 30,273 miles; we had
it in for examination on the 18th inst., and
found the motion practically as good as the
day it went out of the shop, more especially
the slides, about which so many of the people
who spoke at the meeting seemed to have
doubts. I do not think you could get a
visiting card between the slides and the
blocks; in fact, the engine has been sent
out to work again, having had nothing what-
ever done at it. The first thing of course
that will require doing will be the tires; as
far as I can see, nothing else will want
doing for some time."

The Iron Age

AND
Metallurgical Review.

New York, Thursday, September 1, 1881.

DAVID WILLIAMS - - - - - Publisher and Proprietor.
JAMES C. BAYLES - - - - - Editor.
JOHN S. KING - - - - - Business Manager.

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Forty-third Page.—Philadelphia and Pittsburgh Hardware and Metal Prices.

Forty-fourth Page.—Boston Hardware and Metal Prices.

The determination of the mill owners in Cincinnati to employ no union men, is the natural outcome of an unreasonable strike for wages 30 per cent. above the Pittsburgh scale, which has now been more than two months in progress. The owners propose to begin work the first week in September with strictly non-union labor. The result of this determination, if adhered to, will be to break up the union at Cincinnati. What the men will gain by this is not apparent to any one but themselves.

The Wheat and Corn Crops.

So much, as regards the future of trade, depends upon the crops, that careful estimates are always looked for by business men as a basis for all sorts of mercantile calculations. The Department of Agriculture undertakes to furnish this information in its August report. The following statement in tabular form shows the estimated acreage of wheat in 1881 and 1880 respectively in each State, and also the condition of spring wheat on August 1 and July 1 in each State, winter wheat being omitted from the bureau's reports after the July estimates:

ACREAGE OF WHEAT AND CONDITION OF SPRING WHEAT.

States.	Area.		Condition of spring wheat.	
	1881—Acres.	1880—Acres.	Aug. 1, 1881.	July 1, 1881.
Maine.....	41,000	31,150	101	98
N. Hampshire.....	11,000	13,650	99	96
Vermont.....	31,000	39,500	98	96
Massachusetts.....	.....	.....	.....	.....
Rhode Island.....	.....	.....	.....	.....
Connecticut.....	.....	.....	.....	.....
New York.....	780,000	750,661	100	98
New Jersey.....	150,000	133,661	.....	.....
Pennsylvania.....	1,503,000	1,486,606	.....	97
Delaware.....	103,000	87,200	.....	.....
Maryland.....	618,000	534,700	.....	.....
Virginia.....	802,000	981,300	.....	.....
North Carolina.....	665,000	543,450	.....	91
South Carolina.....	174,000	143,900	.....	97
Georgia.....	398,000	409,900	.....	77
Florida.....	.....	.....	.....	.....
Alabama.....	218,000	175,300	.....	.....
Mississippi.....	27,000	55,000	.....	.....
Louisiana.....	.....	.....	.....	.....
Texas.....	250,000	459,000	.....	.....
Arkansas.....	157,000	166,800	.....	93
Tennessee.....	1,955,000	1,551,600	.....	.....
West Virginia.....	431,000	357,780	.....	95
Kentucky.....	1,078,000	600,800	.....	87
Ohio.....	2,920,000	2,099,600	.....	84
Michigan.....	1,950,000	1,725,000	.....	90
Indiana.....	3,903,000	2,816,300	.....	.....
Illinois.....	3,358,000	3,126,000	.....	85
Wisconsin.....	1,455,000	1,680,000	.....	84
Minnesota.....	2,815,000	3,830,000	.....	82
Iowa.....	3,361,000	3,471,000	.....	66
Missouri.....	2,138,000	2,192,000	.....	71
Kansas.....	1,112,000	1,916,000	.....	51
Nebraska.....	1,550,000	1,150,000	.....	74
California.....	2,117,000	2,860,000	.....	92
Oregon.....	731,000	760,000	.....	106
Nevada.....	4,000	.....	.....	.....
Colorado.....	71,000	1,385,000	.....	108
The Territories.....	744,000	.....	85	97
Total.....	36,003,000	38,037,950	81	90
Average condition.....	.....	.....	81	90

This shows a decreased acreage planted and a lower average condition as regards spring wheat. A calculation for both winter and spring wheat, based on the accepted data, leads to the conclusion that the yield of winter wheat will be 239,455,000 bushels, and of spring wheat 154,763,000 bushels; together, 394,218,000 bushels, a decrease of 86,582,000 bushels as compared with 1880. Probably the estimated production will be found in excess of the actual yield, as the damage by unfavorable weather has been greater than can be ascertained. For practical purposes, however, the estimates may be assumed to be approximately correct. The corn-crop estimates of the department, corrected from returns up to August 1st, compared with the July estimate of the condition of the crop, are tabulated as follows:

ACREAGE OF INDIAN CORN AND CONDITION ON AUGUST 1 AND JULY 1.

States.	Corn Area.		Condition.	
	1881—Acres.	1880—Acres.	Aug. 1, 1881.	July 1, 1881.
Maine.....	37,000	53,303	81	88
N. Hampshire.....	37,000	57,737	94	88
Vermont.....	55,000	57,748	89	87
Massachusetts.....	40,300	40,225	84	81
Rhode Island.....	19,000	9,240	85	75
Connecticut.....	56,000	76,500	70	80
New York.....	763,000	708,691	84	86
New Jersey.....	137,000	266,478	86	86
Pennsylvania.....	1,374,000	1,271,590	88	86
Delaware.....	202,000	180,000	88	85
Maryland.....	671,000	457,347	96	90
Virginia.....	1,809,000	1,081,612	94	91
North Carolina.....	1,200,000	1,557,920	89	81
South Carolina.....	1,265,000	1,254,702	41	84
Georgia.....	8,314,000	2,084,900	81	100
Florida.....	350,000	1,730,077	77	88
Alabama.....	1,010,000	1,730,107	75	90
Mississippi.....	1,005,000	1,557,920	72	91
Louisiana.....	746,000	889,881	67	83
Texas.....	2,803,000	2,867,820	46	60
Arkansas.....	1,159,000	972,046	74	93
Tennessee.....	2,817,000	1,954,118	64	87
West Virginia.....	571,000	372,851	87	80
Kentucky.....	2,998,000	1,782,540	60	88
Ohio.....	3,134,000	2,920,021	77	83
Michigan.....	6,437,000	5,110,112	80	77
Indiana.....	3,450,000	3,202,351	79	97
Illinois.....	9,374,000	8,742,178	78	91
Wisconsin.....	1,054,000	1,013,593	95	92
Minnesota.....	480,000	451,490	90	89
Iowa.....	6,437,000	5,110,112	80	77
Missouri.....	5,650,000	3,013,283	70	94
Kansas.....	4,090,000	2,463,470	74	107
Nebraska.....	2,015,000	1,843,920	92	98
California.....	81,000	110,500	95	95
Oregon.....	5,000	3,627	94	91
Nevada.....	.....	.....	100	.....
Colorado.....	14,000	95,337	80	104
The Territories.....	179,000	.....	87	97
Total.....	63,141,000	52,605,031	77	90
Average condition.....	.....	.....	77	90

The deterioration in the average condition of the crop during July is partly offset by the increase of 20 per cent. in the acreage planted. The 77 per cent. average condition would, with the same acreage as in 1880, yield 1,207,000,000 bushels. With the increased acreage we shall probably have a yield of 1,448,500,000 bushels, or 80,000,000 bushels less than 1880.

What will be the effect of this shortage on the business interests of the country? A prominent Wall street banker remarked yesterday, after reading the latest European advices respecting the crops: "Europe must have our grain, and we must have 'their gold.' The vista thus opened, in attempting any definite calculation in regard to the possible effects upon the markets of the United States, is as wide as the world.

"The gold must come," we are told, and who shall furnish it is the question with which England, France and Germany are now struggling. Within ten days the Bank of England has advanced its rate of discount from 2½ to 3, and then to 4 per cent., at which it now stands. The Bank of France also advanced its rate to 4 per cent. almost simultaneously. In Germany the rate has been advanced to 5 and 6 per cent. for discounts and advances respectively, and other institutions govern themselves accordingly in the effort to protect themselves against an outflow of gold to the United States in payment for importations of grain. Our oracles of Wall street and of the local grain market predict that the attempt will prove futile. European institutions would gladly remit American securities in lieu of gold if they had them, but it is a well-known fact that these securities are held by the people and not by the banks, and the people are not disposed to let them go, because they are growing steadily more desirable. The prosperity of the United States, of which the present demand for gold is a new indication, affords an additional reason for holding on.

The wheat movement results from the needs of Europe. The *Mark Lane Express*, in its review of the grain trade for the past week, frankly admits that the recent heavy rains "have brought general disaster and ruin to the crops." It was before known that the English markets were very bare of grain and flour, the stock having been suffered to run out, in reliance upon the new crop about to ripen, but now the promise of the crop is blighted and America is called upon to repair the deficiency. Shipments from this side have commenced on a considerable scale, no less than 1,566,000 bushels of wheat having gone out from this port during the week ending Aug. 26, against 1,000,000 bushels for the previous week, besides 380,000 bushels of corn and 56,000 sacks of flour. This we learn from the official record. And the significant fact should be observed that this movement is coincident with an advance of say 10 cents a bushel on wheat, showing the imperative character of the European demand. Altogether some 3,000,000 bushels have been taken for shipment at the enhanced prices.

In a survey of the situation our most astute observers anticipate a period of prosperity—a continuance of that which we now enjoy—and a money market of comparative ease, favorable to all legitimate enterprises. Among other factors, it must be considered that the government treasury is well fortified in gold, and old financiers observe that whenever there is an accumulation of surplus under such circumstances, it somehow finds its way to the people, contributing to the general ease in all departments of trade. All things considered, therefore, there seems to be no reason to anticipate commercial disturbances as a result of the unsatisfactory character of the crops. We shall have less surplus to carry over into 1882 than last year, but this will give an additional impetus to farming operations, and insure whatever good to trade results from prosperity in the agricultural districts.

"Fair Trade."

The meeting held in Exeter Hall, London, on the 9th of August, led by Sir Algernon Borthwick, passed two remarkable resolutions. The first was: "That this meeting 'protests against the iniquitous system of foreign State bounties which are paralyzing British labor and destroying British industries, and while regarding with surprise and indignation the conduct of Her Majesty's government, demands as a matter of right and justice that Parliament 'should impose such revenue duties as will intercept the bounties and enable British manufacturers and workmen to compete on a fair footing with foreigners in British home markets.' If artificial aids to industry are 'iniquitous' on the part of foreign States, do they become sanctified when adopted by Parliament for the protection of British industry? The second resolution reads: "That this meeting, regarding with grave apprehension the present condition of British commerce and labor, owing to the operation of foreign protective tariffs, declares that the interests of the country demand the imposition of such revenue duties on foreign products 'as will allow British products to compete on a footing of equality with those of foreign nations at home and abroad.' In other words, they demand that Parliament shall imitate the 'iniquitous' measures which are paralyzing British labor and trade, to the end that Great Britain may prosper. This whole business is entirely characteristic of the British temper. Whatever is inimical to British interests is iniquitous; whatever Great Britain does is all right. The greatest satire possible on the commercial history of Great Britain is this new cry of 'fair trade.' Fairness in trade is something which the British nation has never known. Her 'wars of the yardstick' have been a burning disgrace to civilization. Whenever she has had the power to suck the life-blood of a weaker nation, she has done so without hesitation. Her 'fair trade' with India has ruined it. Her 'fair trade' with China, enforced by the strong arm of military power, has kept that country's ports open to the most pernicious of drugs, that the poppy crop of India might continue profitable. The Chinese government would gladly emancipate the nation from the

opium curse, but British "fair trade" forbids. Her "fair trade" with Japan, also enforced at the cannon's mouth, has been for years a millstone around the neck of a nation with all the potentialities of rapid and sustained industrial development. Her idea of "fair trade" always was, and always will be, much like that which the lion has in his dealings with the unprotected lamb. What helps England is fair, no matter whom it hurts. What hurts England is iniquitous, no matter whom it helps. Is it not about time that a check was put on British arrogance in such matters? Should not the protests of China and Japan, of Ireland, mourning her ruined industries, and India, despoiled of wealth and the power of self-sustenance, be heard by the great powers? Have weaker nations no rights which England is bound to respect, and which other nations should defend? There will come a day of reckoning by-and-by, and when it comes England will rue it. Meanwhile, no one will be frightened by her denunciations or deceived by her specious misrepresentations. Her talk about "fair trade" only excites derision among nations which do not fear her aggressions.

Our Foreign Trade Statistics.

The statement of imports and exports issued by the Bureau of Statistics for the fiscal year ended with June, affords the basis for some interesting comparisons. The value of the imports of merchandise free of duty was \$202,491,547 in 1881 and \$208,301,863 in 1880. The principal imports free of duty were as follows:

	1881.	1880.
Argols.....	\$2,260,005	\$2,105,403
Chemicals, drugs, dyes, &c.....	5,330,605	6,730,138
Coffee.....	58,775,391	60,350,769
Fur skins, undressed.....	2,826,592	2,406,977
Gums.....	3,170,517	2,444,302
Hides and skins.....	37,597,111	30,002,254
India rubber and gutta percha.....	11,054,949	9,656,239
Indigo.....	1,535,530	2,759,900
Rags.....	3,307,539	5,474,737
Silk, raw.....	10,868,264	12,024,692
Soda, nitrate of.....	2,356,183	1,805,110
Sulphur, crude.....	2,713,404	1,927,502
Tea.....	21,014,813	19,784,631
Tin, in plates.....	3,977,742	6,223,176
Free articles from Hawaiian Islands.....	5,373,077	4,464,453

The total value of the imports of dutiable merchandise was \$440,173,081 in 1881 and \$459,652,883 in 1880, a decrease of \$19,479,802. The following are some of the items:

	1881.	1880.
Coal, bituminous.....	\$3,004,777	\$1,593,595
Earthen, stone and china ware.....	6,580,223	5,650,267
Glass and glassware.....	5,777,918	5,271,311
Iron and steel.....	8,303,453	14,654,337
Fig iron.....	2,494,670	5,107,510
Railroad iron.....	3,686,338	2,792,759
Old and scrap iron.....	6,381,608	13,304,513
Steel ingots, bars, &c.....	6,217,443	4,599,407
Steel railroad rails.....	4,498,050	2,101,527
Tin, in plates.....	14,186,299	17,225,266
Wire in coils.....	2,743,428	2,355,705
Wood, boards, planks, joists, &c.....	6,279,006	4,089,880

Of the total imports of merchandise the following were

	1881.	1880.
Entered for consumption.....	\$490,500,822	\$501,944,078
Entered for warehouse.....	137,183,947	153,080,662
Entered for immediate transportation.....	14,770,839	12,990,006
Brought in cars and other land vehicles.....	17,193,313	15,144,465
Brought in American vessels.....	333,731,991	149,317,368
Brought in foreign vessels.....	491,739,321	503,494,913

The relatively heavy loss of freights carried in American vessels looks bad for our merchant marine.

As indicating the course of trade and the general prosperity of the country, it is interesting to note that while there was a decrease of \$19,000,000 in the importation of dutiable merchandise, the customs revenues show a coincident gain of \$11,000,000. This results from the increased importation of costly luxuries and articles carrying high rates of duty.

The exports of domestic merchandise were valued at \$883,915,947 in 1881—an increase of \$59,969,594 over 1880. The following are the values of the principal articles of export.

	1881.	1880.
Iron unmanufactured.....	\$247,696,746	\$211,535,005
Wheat.....	167,628,485	190,546,305
Wheat flour.....	45,047,265	50,720,473
Cotton and hams.....	50,720,673	53,098,247
Wool.....	61,161,205	50,097,621
Woolen goods.....	15,255,257	27,680,357
Cash beef.....	10,380,385	10,379,125
Woolen goods.....	9,860,434	7,444,216
Woolen goods.....	2,665,011	2,188,407
Woolen goods.....	6,000,600	6,000,600
Cash, preserved.....	5,971,090	7,677,201
Woolen goods.....	8,972,285	5,910,252
Woolen goods.....	6,500,600	7,600,633
Woolen goods.....	14,345,257	14,345,257
Cash, leaf.....	18,713,043	10,444,125
Woolen goods.....	34,317,682	34,718,575
Woolen goods.....	7,713,734	5,744,300
Woolen goods.....	10,380,385	10,379,125
Woolen goods, colored.....	4,042,312	2,065,706
Woolen goods, uncolored.....	6,024,374	5,834,541
Woolen goods.....	2,305,118	2,726,640
Woolen goods.....	3,041,313	1,100,560
Woolen goods and fur skins.....	5,444,769	5,404,418
Woolen goods.....	9,016,970	5,753,209
Woolen goods.....	8,878,168	8,586,688
Woolen goods.....	4,004,068	7,737,193
Woolen goods and manufactures.....	28,307,673	16,155,325
Woolen goods.....	331,081	210,527
Woolen goods, manufactures of.....	28,307,673	16,155,325

ing. Several facts prove that quality of plates is coming to be considered independent of brands; that brands may come and brands may go, but the actual working quality of the plates is the one thing to determine price. A prominent importer recently asserted that, in his opinion, the day was not far distant when brands would be disregarded—when private brands and makers' brands alike would cease to be of any special use or importance, and all sales would be based upon actual quality. Just how trade is to be conducted when this stage is reached, he did not attempt to describe, but undoubtedly a substitute for brands of tin plate can be devised. The present system of grading is no system at all, and makes possible all the abuses to which the trade has been subjected. Better means of denoting quality can be found without much difficulty. The oil-can manufacturers of this city for some time past have disregarded brands and bought all their tin upon sample alone. Other prominent industries consuming large quantities of tin plate have experimented in the same direction with satisfaction. The Baltimore packers found that brands no longer indicated quality, and therefore demanded that grades be restored to original standard. Their protest and notice availed nothing. B V Cokes are to-day just where they were a few months since. Meanwhile, the Baltimore packers are buying the quality of plates they require for use, irrespective of brands, and are paying for them according to their value.

A striking feature of the trade in tin plate at present, as evidenced by the advertisements of leading houses, and also by the stocks they are carrying, is the prominence given to plates which, in their quality and finish, differ from the average grades of the last few years. Makers' brands have become a set phrase, and orders are solicited for plates of this sort on the reputation of the brands. These, for the most part, are standard, and have endured the storm of rivalry and competition which has been raging so fiercely. Now that the sky is clearing, they again appear in their true colors and in their proper place, and bid fair for the future to be as great favorites as ever in the past. Some importers, not content with thus returning to what, in contradistinction to the shame of the past, may be called a legitimate business, go further and announce plates for sale made by old processes—a direct appeal to the trade, which bears in memory the satisfactory quality of the plates made some twenty-five to forty years ago. New processes, patent rolling, and the like, all of which have had for their object the cheapening of plates, but which accomplish it, for the most part, at the expense of quality, are being discontenanced, and the announcement that a plate is manufactured in the old way is assumed to be conclusive evidence that its quality is excellent.

Such are some of the more prominent features of the tin plate trade at the present time. It is evident that consumers are becoming alive to their own interests, and that manufacturers see the folly of making any other than reputable goods. The importers of this country, in their capacity of middle-men, are aware of the change that is taking place, and, as prudent managers, are bringing to this market more of good plates and less of indifferent to bad quality than formerly.

Hours of Labor.

Careful inquiry seems to reveal the fact that men are adapted to certain hours of labor, and that when the attempt is made to accomplish more work by increasing the number of hours, thereby shortening the seasons of rest, nature asserts herself and defeats the conspiracy by means peculiarly her own. Just at present, both in our own and in foreign countries, the question of the length of a day's work is being carefully considered, in an effort to determine the happy mean between two extremes. The investigation is a practical one and promises substantial results. The Bureau of Labor Statistics maintained by Massachusetts has made an exhaustive personal inquiry in the textile factories of New England and this State, studying the effects of shortened days so far as adopted, and the feasibility of uniformly adopting them. A series of questions to employers and employees was issued, and the detailed replies occupy some fifty pages of an octavo report, arranged in semi-tabular form. The writer of the report was greatly impressed by hearing personally the same questions answered in the same way, and almost in the same words, by hundreds of persons who are widely separated and speak not only without concert, but without having any knowledge of one another. Massachusetts is the only ten-hour State in the Eastern cluster of textile manufacturing districts, but the production there per loom, per spindle or per man is not less than in the other States, nor are wages less in Massachusetts; the conclusion is that the facts elicited show no reason why the other five States (Vermont not being included in the inquiry) should not adopt the ten-hour system, and with like success.

By far the most interesting, as well as most encouraging, fact brought out is that the shorter hours are favored by expediency, expressed in results. Many employers are of opinion that ten hours will produce as much as twelve. A number of mills are cited which have actually reduced to ten,

and yet, paying the same wages as in neighboring eleven-hour mills, have found their product and their profit satisfactory, and not reduced by the change so far as they could judge. The manager of a carpet mill employing 1200 persons said that during certain seasons of pressure the eleventh hour had been added, the result being a material increase of product in the first month, after which "the help would grow listless, the production would fall off, and the quality of the goods deteriorate." The Willimantic Linen Company changed to ten hours two years ago, with the result of a considerable loss of product during the first six months, which was, however, attributed as much to other causes. After this the eleventh hour was still left off, but wages remained as when eleven hours were the day, and production showed no loss. To these two experiences of changes in opposite directions, but teaching the same conclusion, may be added the still more forcible narrative told by a manager whose cotton mill, when he took charge of it, was running thirteen hours a day and producing 90,000 yards of print cloths per week. He persuaded the directors to allow a reduction to eleven hours, and forthwith, from the same machinery and hands, the weekly production rose to 120,000 yards.

In Switzerland the inspectors under the eleven-hour Factory Law of 1877 report similar results. One weaving house ran its machinery a little faster, and thus got as much out of eleven as out of twelve hours; then reduced the piece wages, but the increased production made gross wages the same as before. Another mill reduced to ten hours, and the owners were surprised to find the amount of wages by the piece the same as it had been under eleven. Another added an hour to the twelve, and the increased production hardly paid for the light. The general testimony is that the fear of diminished production was unfounded and that eleven hours yield as much as twelve.

This testimony, that eleven hours are as effective as twelve, and ten hours as good as eleven, is gratifying but not surprising. It does not mean that nine are as good as ten, eight as good as nine, and so on; there is no paradox, for no more can be got out of a workman than is in him, and, although it is in his power to stand in his place an additional hour or two, he cannot put anything more into results. Down to the working day which represents the operative's full efficiency, a reduction of time means an increased effectiveness which prevents any decreased production, and hence the shortening is a boon to the worker without cost to anybody else; carried beyond this happy medium—which is probably at ten hours, but possibly at nine—production would, of course, fall off. The better the workman, the better the work. Improvements in machinery all increase production, but improvements in the man should not be thought useless. Every step in bettering his condition, lightening the burden of his task and teaching him thrift and hope, will return something in the quality, economy and effectiveness of his work. Hence the employers who spend some care on the condition of their operatives, housing them comfortably, providing some facilities for study and amusement, and trying to reduce their exhaustion by every practicable means, must be reckoned wise in their day. It is not all philanthropy; it may be the most enlightened selfishness, for that always dictates some regard for others.

Judge McCrary, in one of the Western United States Circuit Courts, has rendered a decision of more than ordinary significance. The case was that of the Southern Express Company against the Memphis and Little Rock Railroad Company, in which the express company sought legal protection against a refusal of the railway company to permit it to do business over the line of said road. The decision was to the effect that the railroad company was bound to carry goods for the express company, and must not discriminate against it either in favor of itself or of other express companies; and the Judge went on to declare that he had no doubt of the power of the Court to fix the maximum rates to be charged for the transportation of express matter by a railroad, though as a rule an order for this purpose should not be made "until after a reference to a master, and a report by him after a hearing." If this decision is sustained it will mark a turning point in the history of the popular contest with the chartered monopolies. We cannot see that it is in any way at variance with the principle of common law on which we assume it to be based. It makes the railroads what they were intended to be—public highways—and recognizes it as a condition of their charters that they shall treat all customers alike. This decision strikes at the root of the worst evils charged against the railroad monopolies, and points out a practicable remedy under existing laws.

We print elsewhere in this issue some interesting matter, furnished from New Zealand by a correspondent of the *Ironmonger*, relative to American and English hardware in that market. This correspondent does not indulge in generalities, but deals specifically with well-known makers of goods, and speaks concerning them as if he knew just what he was talking about. It will repay reading.

Extracts from the Reports of the Bankers' Convention.

At the convention of the American Bankers' Association, which opened at Niagara Falls August 10th, Mr. John Thompson, president of the Chase National Bank of New York city, read a paper on the subject of panics. Mr. Thompson said:

"The question is so often asked, 'When will this great prosperity end, or when will another panic sweep over the country?' that it becomes not only interesting, but absolutely essential to our safety, to get the best ideas possible and to analyze the signs of approaching danger. Foreboding future events—prophesying—is extra hazardous business. Still, I will recklessly lead off into the financial future, begging you, gentlemen, to not only discount, but to take rack usury, if you please, of my views. Panics do occur about every decade. This ten-year period is quite natural. It takes about five years after a revulsion to pay up, compromise or wipe out indebtedness. Then follows five years of prosperity, expansion, confidence in credits—in fact, a boom. The last panic was in 1873. The present prosperity commenced in 1878. We have now had three years of extraordinary augmentation of riches, much of it really solid, but most of it emanating from raising prices or putting up quotations. The signs of an approaching 'blizzard' are numerous, but very delicate as yet. When the stock market becomes 'mixed,' and the bulls and bears become desperate, and when the courts grant injunctions liberally and the financial knavery of the opposing parties and schemes is exposed, then capital and credits insidiously vanish—hoarding is considered the best investment, or loans secured beyond any contingency, even at a nominal interest, which is akin to hoarding. This species of financing involves contraction; distrust follows, and the credit system is annihilated. When we consider that nine-tenths, and, I think, nineteen-twentieths of our money, so called, is credit and nothing else, it is no wonder that financial panics come suddenly. The most important sign of a coming panic and revulsion is to be found in our trade balances with foreign nations. As over-prosperity has been hugely augmented by the importation of gold, so, when the flow of the precious metal is from us, distrust will lead directly to inability to pay. Money not only becomes scarce, but it is absolutely gone. In fact, there is at no time but an inadequate amount of money to do business on. I feel confident that over 95 per cent. of our business and the business of England is done on paper tokens—checks, drafts, notes, letters of credit, &c.—which, so long as confidence is good, are a perfect substitute for money; but, like young partridges, disappear 'on call,' not allowing even three days' grace. Discounts are declined, deposits drawn and hoarded. Thus, not only the credit system and the money token power is destroyed, but the real money itself disappears, not to be again visible until induced to come out by an enormous depression in prices. At present there is but one alarming indication of trouble, and that is in the number and magnitude of new enterprises, involving the issue of millions of obligations. In 1871-72 and for half of 1873, this same sign of coming trouble was apparent, but to a fractional extent as compared with the present. As this is purely a convention of bankers, and as I am probably the oldest member of the association, I must be excused in uttering a word of caution to bank managers, more particularly to those at the head of deposit banks. In receiving deposits from the general and promiscuous public, we morally, though perhaps not legally, assume a fiduciary trust; and in using such deposits the utmost caution and conservatism should be strictly adhered to by always having a sure and speedy controllability over a sufficient amount of our assets to meet any demand obligation, even in the height of a raging panic. It is criminal to assume liabilities or enter into negotiations, though ever so promising, over which hang a contingency that may possibly endanger this fiduciary trust. Intimately connected with the ideas that are briefly expressed above is the spirit of speculation, bordering on gambling. It is safe to say that during the past three years nine out of every ten ventures have netted a profit. This is because almost continually prices have advanced. When the panic and depression shall come—as surely they will—then all ventures will be losses, and many 'lamb's' will come to grief. I simply touch on this topic because in the delinquency of bank officers it is often shown that the defalcation is the outcrop of a venture. Banks that undertake heavy negotiations which, if fortune favors, will yield enormous dividends, but if fortune frowns, bankruptcy is inevitable, must always stand in the category of doubtful institutions."

Mr. W. E. Gould, of Portland, Me., in closing his arguments on banking policy in general, said: "If I were to write a book, I should be tempted to write one of advice to young men who are about entering mercantile life. I should say a few words on the relations of merchants to the banks. The feeling of reciprocity between the two classes ought to be in every way encouraged. The banker is interested in the success of his dealer. He sees a great many accounts, and he can be of much aid to the merchant in exposing tricks and extended credits, and the peculiar ways of men who deal with the merchant. The merchant should feel that the banker is his friend; that if he criticizes, it is for good motives. For instance, here is a young man just starting in the wholesale grocery business. He is ambitious to do all the business that he can, and probably tries to do more than he ought to. In his anxiety he strikes out for new accounts, and sells some country traders very large bills. He takes their notes and carries them to his bank for discount, where he is kindly told that he is selling such a man too much for his good, and the bank declines his paper. Now, the banker notices that another concern is working hard to shove that customer off, and this ardent young man may get a big load before he is aware of it. I can recall very many cases where merchants would have saved many bad debts if they would

but have taken a hint kindly given. I should also caution young merchants not to attempt any sharp practice on their banks. Fictitious balances or balances arranged so as to look well the last day of a month, and exchanged checks, and a thousand and one little sneaking ways, only hurt a merchant and destroy his credit. The banker's ledger generally shows a continuous balance, varying with each transaction. Averages, and not 'put up jobs,' show the value of an account. My judgment is that there is now but very little 'shaving' and 'grinding' exercised by the bank toward the borrower. Nor is there any disposition of this kind in respectable quarters. Money is an article of merchandise. It has its price. Its price varies, like the price of sugar and flour. Firms of undoubted credit can hire money lower than can some others of lower credit, just as ready money and a sharp buyer can buy 100 barrels of flour cheaper than a man who purchases on four months and is slow pay. It is true that banks do not discount all the paper that is brought to them. Nor are they bound to. They have the right of choice as much as a merchant has whether he will trust out a bill of goods."

Better Protection for American Ores.

PHILADELPHIA, AUGUST 23, 1881.

To the Editor of *The Iron Age*.—Your interesting leader, entitled "The Tariff on Foreign Ore," recalls some remarks of the *American Manufacturer* on the same general subject. The *Marquette Mining Journal* demands such protection to ore as will "stimulate production and consequent competition," instead of a "juggle sort of tariff which admits foreign ore mined by pauper labor into competition with the home miner, who is, by reason of the protection given to other industries, compelled to pay the highest prices for labor," &c. The *Manufacturer* replies that they have never heard of any complaint from the iron ore miners or their organs, except that periodically made by the *Mining Journal*, &c. Let a mine operator of the Atlantic seaboard say that if "no complaint" has been heard from the Eastern slope in regard to the duty on foreign iron, it is only a proof of our lack of organization and need of more intelligent representation. If the principle of protection to American industry is sound, iron ore is entitled to its fair proportion. If "alleged enormous profits" connected with Lake Superior mining make a valid reason for doing away with protection to iron ore, why should the duty on steel rails remain at \$25 per ton? Whether the business of making Bessemer rails is absolutely open to home competition seems to be in doubt; it certainly is practical to buy ore mines, even in Lake Superior. Why should not our Pittsburgh manufacturers buy and operate lake properties? Some of the Hudson River furnacemen are interested in Lake Champlain and Dutchess County mines, and, as a rule, the Lehigh iron men control the more important magnetic deposits of New Jersey.

The writer having been engaged in mining ore and making charcoal iron in Lake Superior for several years, knows that mining risks, as well as profits, are taken there as elsewhere. It required pluck and persistent faith to open mines in the early days; to cut down forests and provide adequate shelter for workmen; to accumulate supplies for rigorous winters, extending from November to May, and thereafter to build railroads, wharves and shipping. If the harvest, on the whole, is great, surely such enterprise, genuinely American, should succeed. Where, however, has intelligent business energy proved more splendidly successful than in the Pittsburgh district? It is not long since our Eastern furnacemen heard it "alleged" that \$4.50 at ovens for Connellsville coke yielded rather handsome profits, and they now feel that \$4 per ton at furnace for Anthracite is not in fair proportion to \$19 for gray forge iron.

The market for Lake Superior ore, being 300 to 500 miles West of the seaboard, is not, perhaps, seriously broken into by foreign competition, but how is it with the New Jersey operator? The mines are located on the rugged mountain ranges of Northern New Jersey, extending from the New York line at Stirling through Passaic, Morris, Sussex and Huntingdon counties, with light outcrop near the Delaware River, and on the Pennsylvania side considerable mines at Durham Iron Works. The great bulk of the ore produced last year comes from the old and deep mines of Central Morris County, the output from open cuts or surface diggings being but trifling outside the Chester district, which raised little over 50,000 tons. As an example of the necessarily costly character of the deep work, one celebrated mine, producing 2000 tons per month from a vertical depth of about 1000 feet, containing with heavy bodies of water, consumes under boilers 250 tons coal monthly. To deliver Jersey ore to the nearest market (outside local furnaces), that of the Lehigh, there are usually the local charges of a lateral road, besides rate of main lines, costing for a haul of 70 to 80 miles, say, \$1.25 to \$1.50 per ton; while to reach the Schuylkill Valley the transportation runs up to \$2 to \$2.25 per ton.

The railroads bringing coal to, and ore from, the Jersey district, having "pooled their issues," and nature having provided no water outlet, we certainly "take two exceptions to the present duty on ore—first, that it is not high enough, and second, that the duty should be specific and not ad valorem." Foreign ore, invoiced at figures based on Spanish and African labor, is carried to the steel works at minimum rail charges, every important track terminating at or convenient to tide eagerly competing for this carriage, while American railways second American legislation in discriminating in favor of foreign ores.

JERSEY.

Since the introduction of dynamo-electric machines a good many valuable watches have been almost completely ruined by having their works magnetized. Mr. Maxim, the electrician, has, however, invented a machine, now at the Paris Exhibition, which in a few minutes completely demagnetizes a watch, leaving it as free in its movements as ever. By mechanical ar-

rangements the watch to be demagnetized is given a compound rotary motion near a revolving electro-magnet, and is at the same time gradually withdrawn from the latter's influence. The theory is that the watch is subjected to rapid reversals of polarity in a gradually weakened magnetic field until the final reversals are practically nil. At all events, the machine restores to running order a watch so thoroughly magnetized as to be incapable of making a single stroke of the escapement lever.

The Calorific Power of Coal Gas.

At a recent meeting of the British Association of Gas Managers, Mr. F. W. Hartley read a paper on the "Calorific Power of Coal Gas," in which he gives the results of a number of carefully conducted experiments. He took a Bunsen burner with four $\frac{3}{4}$ inch tubes as a standard, inasmuch as the results it gave were higher than those realized with any other. The indicated calorific powers, after correction for barometric pressure and for the temperature, ranged from 365 to 392, the water being raised from various temperatures between 40 and 60 degrees up to 210 or 211 degrees, and the average result being 382 units per cubic foot. Under similar conditions, and using each burner in such manner and with such rate of consumption as was found to give the highest effect, a cluster of small fishtail burners gave results equal to 98 per cent. of the standard; an 8-tube Bunsen, 92 per cent.; Wallace's solid flame, 97 per cent.; a common shilling article, which is called the "Egyptian," 91 per cent.; another known as the "Dépôt," 83 per cent. One, which is much vaunted as excelling all others by its very modest construction, gave 93 per cent.; and a larger one of the same kind 87 per cent., with the accompaniment of a detestable smell if the rate of consumption were unduly increased to a very trifling extent. Taking the average of the results realized with the best and with all the many gas-stove boilers tested, we have 360 units indicated as the power of the gas per cubic foot in raising water to 210° or 211° F. If, as Mr. Hartley believes, the real power of the gas employed was, on the average, 680 units, 320 units, or 47 per cent. of its heat, were lost. The experiments made agree perfectly well with those made by Mr. Lewis Thompson with the gases of several companies in the years 1852-3; the average results of his experiments being 374 units per cubic foot.

Stockholm Iron Gondolas.

A correspondent says: Behind the palace of the King of Sweden, at Stockholm, is a spacious quadrangle, with a thoroughfare for foot passengers. A fine art gallery and small, though highly cultivated, gardens flank the eastern side, and a paved courtyard, where are some small field guns, the western. It is altogether a most noticeable building, but we must not proceed any further than half way toward it, cross only one bridge, and find ourselves, by descending a flight of steps, in the grounds of "Bairn's Café." A landing stage, nearly level with the water, enables us to get on board the prettiest imaginable little screw propeller. She is canted around by a boy, bent-hook in hand, and darts away at surprising speed. These vessels—Stockholm's gondolas—average about 50 feet in length by 8 or 9 feet beam, with engines of from 1 to 5 horse-power. Their machinery appears to my unprofessional eye very compact and simple. Boilers tested up to 120 pounds pressure on the square inch, while working power of 60 pounds is the maximum strain permitted by law; the miniature cylinder, fixed vertically above the shaft, diameter or length of stroke unascertained, and patent indicator pointing steadily to 59, no allowable pressure being lost. They use coke for fuel, and have everything exposed to view except the shaft. A seat extends all around, with awning in bow and stern. Chilly persons can put their feet on the boiler, or seat themselves near the furnace door. Others, preferring a cool place, may avoid the engineer with his snorting charge, and sit aft by the captain, or else go well forward to the bow. How busy he is—stoking, fending off, making fast and collecting our fares. This youth represents, in fact, the crew, and cannot blunder for want of officers, since there are two grown-up men over him. He carries a leather bag filled with brass checks and small change, and goes through the ceremony of selling these checks for ten ore (three half-pence) and collecting them again soon after, by which I imagine that his left hand keeps a sort of control over his right, to the strengthening of his better nature. A friend desirous to maintain the common sense of the check system asserts that it originally implied supervision by the captain, who was ex-officio the proper collector. Your readers will like to know at what rate we steamed. I should say that seven knots an hour was our lowest speed, and to knots our highest; for the size of the boat makes a considerable difference, being, as is the inch on a man's nose, an important item when the scale is so limited. I am told that a new Swedish angler, completely equipped with an engine of 2-horse-power, and capacity for taking 60 people—their licensed number—in smooth water, costs less than 300 guineas. They are elegant models—iron built, with round stern and fine hollow bow, having, moreover, considerable sheer.

The barbed fence wire controversy has taken another turn. A correspondent of the *Chicago Tribune*, writing from Des Moines, Iowa, states that Jacob Haish has joined the combination and withdrawn his appeal to the Supreme Court. If this is true, it leaves the battle in the hands of the Iowa State Farmers' Protective Association, with a good deal less encouragement than its members were disposed to draw from the fact that their fight was already half fought for them. There are two ways of viewing Mr. Haish's action. Either he expected to lose his suit on appeal, and consequently decided that it was better to settle now on favorable terms, or it was made to appear to him that it was not to his interest to win it, as the business would then be thrown open to unrestricted competition.

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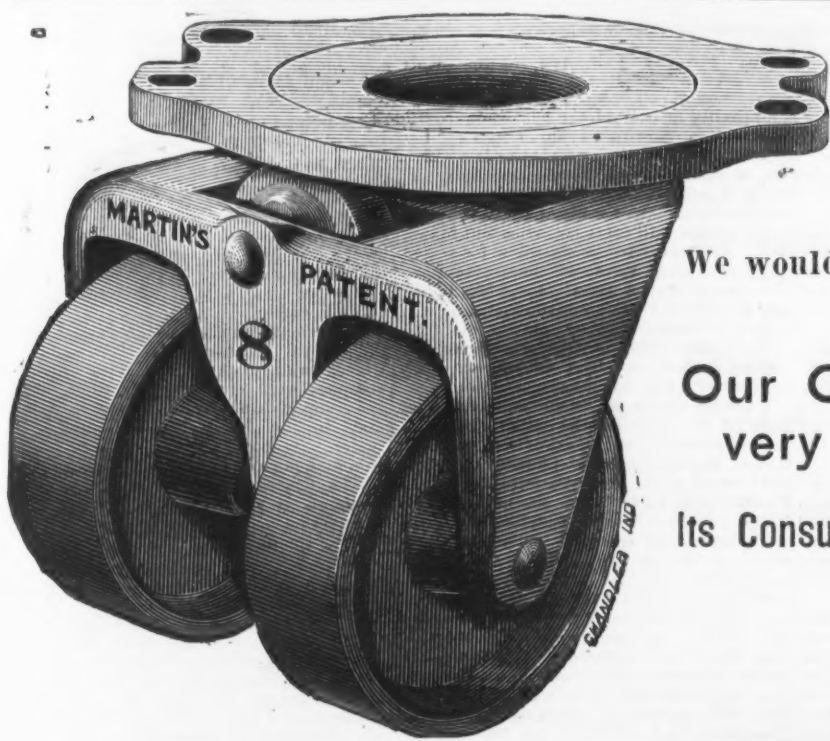
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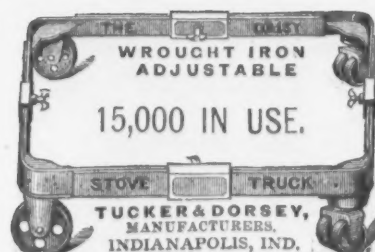
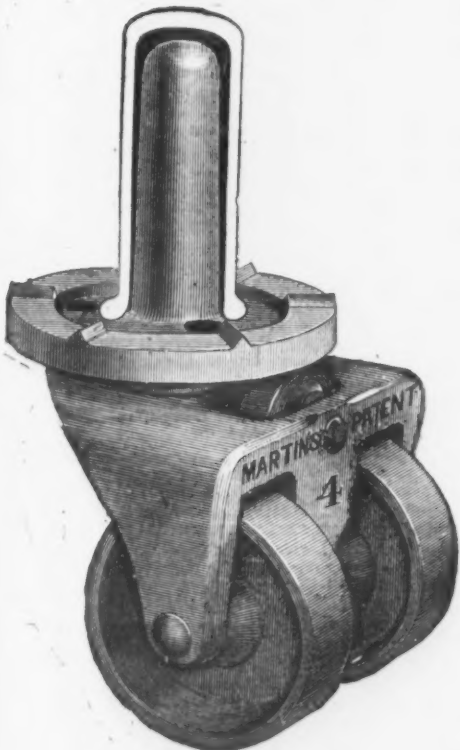
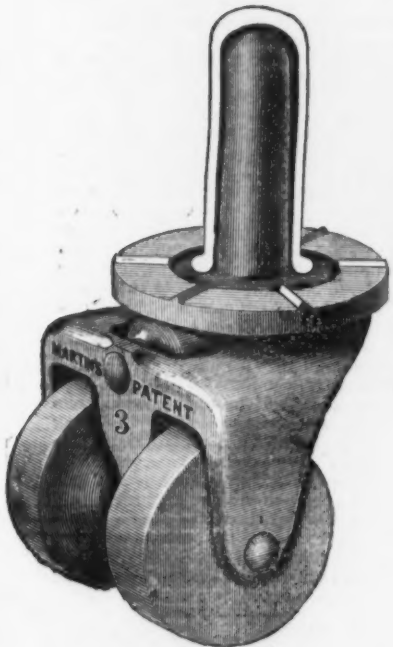
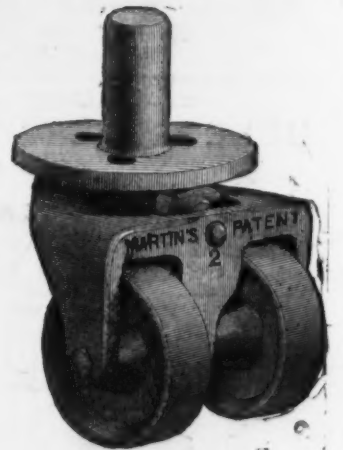
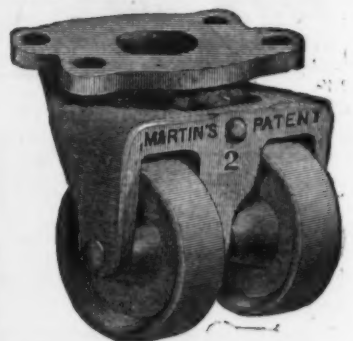
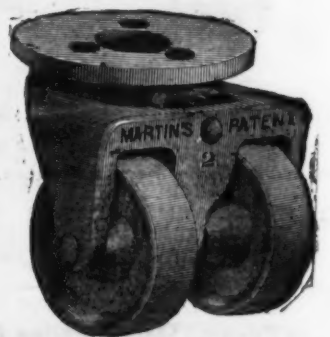
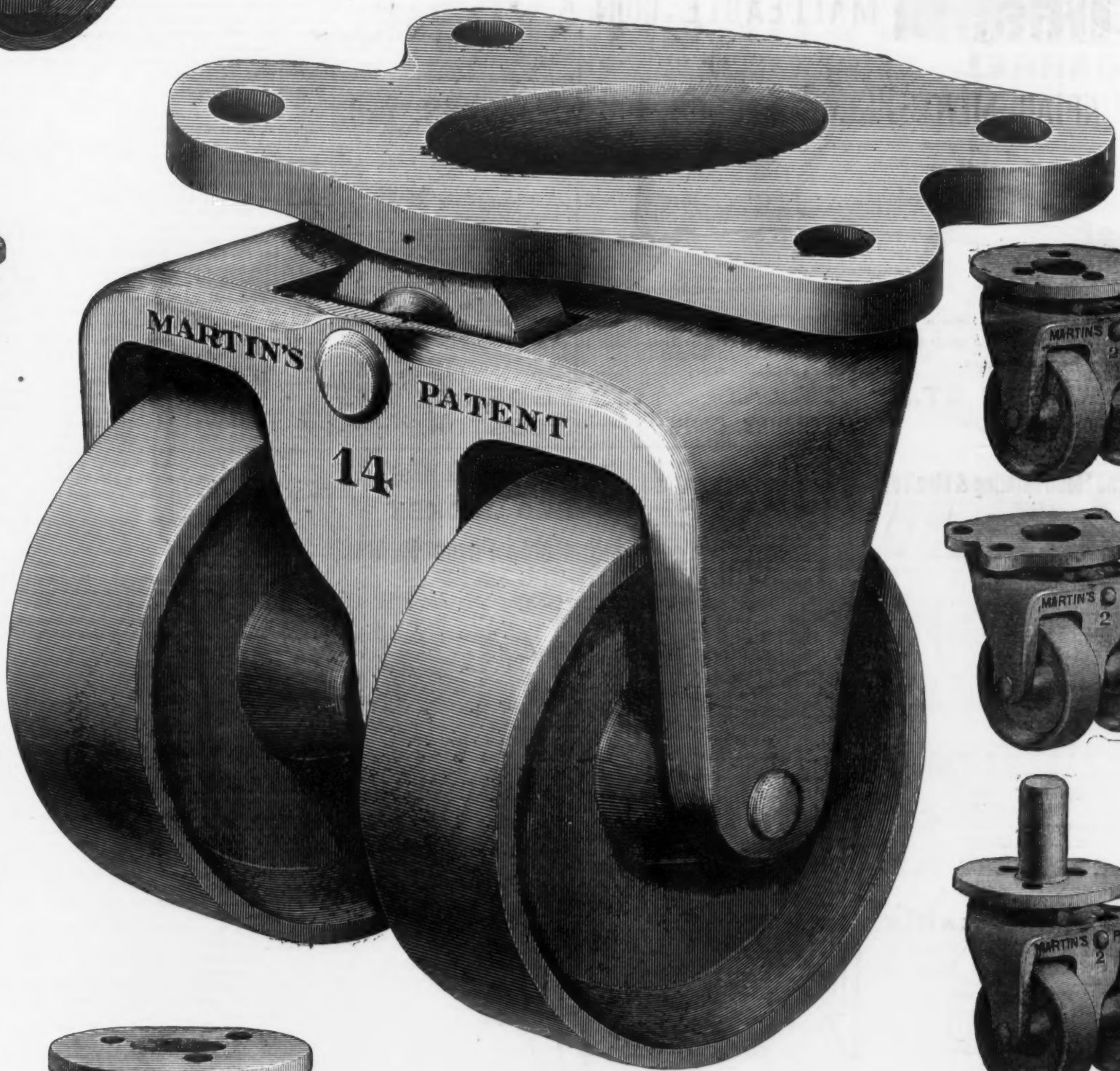
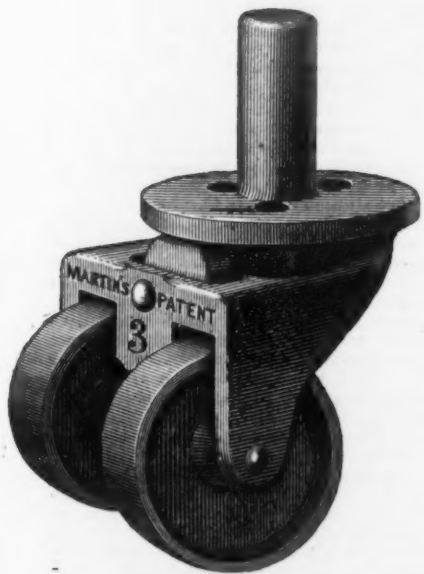
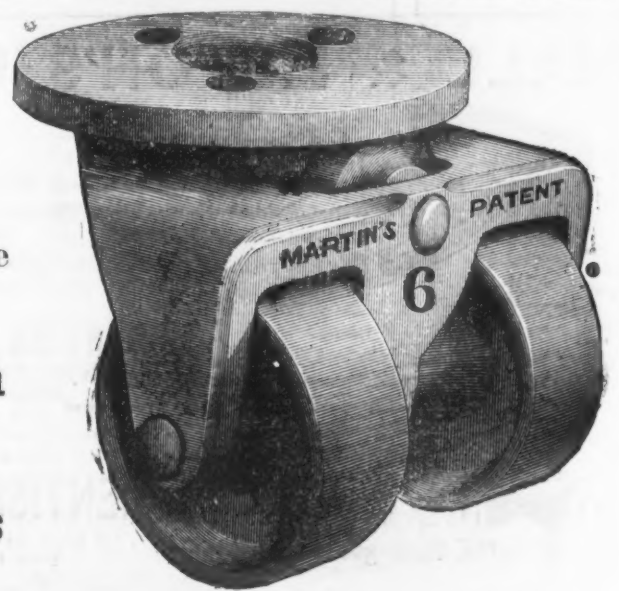
Water glass is used for a large number of purposes in the arts, but it might find many every-day uses if better known. Mixed with chalk, it forms, on drying, a compact, marble-like stone; bone ash, zing white and magnesia with water glass form similar stones. Ransom's artificial stone is prepared by mixing sand with water glass solution to form a plastic mass, which is pressed into the required shapes and then placed in solution of calcium chloride; silicate of calcium is formed and cements the grains together, the chloride of sodium formed at the same time being removed by washing with water! With clay, lime, sand, cement, &c., soluble glass enters largely into the composition of many of the patented artificial stones, plastic tiles, slates, &c. The detergent properties of water glass make it an excellent scouring material, and it enters largely into the composition of most of our common soaps.



We would be pleased to supply our New Catalogue to the Trade.

Our Caster is Applicable to a very Large Variety of Uses.

Its Consumption has been doubled four times in four years.



HOOSIER SAW BUCK.

TUCKER & DORSEY, Manufacturers,
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The Only Perfect Folding Saw Buck in the Market.


Torrey's Door Springs.
S. ROEBUCK & CO.,
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 164 Fulton St.,
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Torrey's Patent
 COG WHEEL
Ice Cream
Freezers.

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 Adjustable Jaw.
 Stationary and Pat. Swivel Bottoms.
 Adapted to all kinds of Vise Work.
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 23 Dey Street, New York,
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 Hammer's Malleable Iron Hand Lamps.

 Screw, Kerosene Size.
 Hammer's Adjustable Clamps.
 Hammer's Malleable Iron Oilers, 3 Sizes.
 Hammer's M. L. Hanging Lamps.
NEW pattern Heavy Screw Clamps;
 strongest in the market.
 For sale by all the principal Hardware Dealers.
 Send for Price List.
MALLEABLE IRON CASTINGS
 Of superior quality, and Hardware Specialties
 in Malleable Iron made to order.
HAMMER & CO.,
 Branford, Conn.

"Climax"
BARREL
TANK ATTACHMENTS.

"Climax"
 Is designed to be attached to any Barrel or Cask,
 thereby converting the same into a temporary Tank,
 fitted with an effective Pump, and while protecting
 contents from dirt and waste, the owner has entire
 control of same, by simply locking the cover.
 It entirely does away with the labor and waste
 attendant upon emptying Barrels into any of the
 numerous Metal Tanks, while securing all the con-
 veniences of the same, at a greatly reduced cost.
 The Apparatus can be adjusted in a few moments
 to a Barrel of any size, and as quickly shifted to
 another when contents are exhausted, the process of
 connecting being very simple.
 It is as compact in form as is consistent with perfect
 efficiency, and we feel confident that a trial will
 demonstrate its practical value.

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 demonstrate its practical value.

WHO HAS USE FOR IT?
EVERY ONE
 Who buys in bulk any of the various
 kinds of Oils, or in fact any Fluid
 that can be Pumped;
 Every Mill, Factory, or Work-Shop, where Oils or
 other fluids are used, and every store where such
 fluids are retailed, will find the "CLIMAX" just
 what they require.
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PANCOAST & MAULE,
 Nos. 243 & 245 80. THIRD STREET,
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A. WYCKOFF, Manufacturer,
Chain Pump, Tube, &c.,
 ELMIRA, N. Y.
 Established 1838.
Bevin Bros. Mfg.
Co.,
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 Manufacturers of
SLEIGH BELLS,
 House, Tea, Hand,
 Gong Bells, &c.
 Bell Metal Kettles.

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DISCOUNT SCREW LIST
 NOW READY. Revised April, 27, 1881.
 Complete list with 14 discounts. Price, 50 cts.
 Published by
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 Screw, Kerosene Size.
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 Hammer's Malleable Iron Oilers, 3 Sizes.
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NEW pattern Heavy Screw Clamps;
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 For sale by all the principal Hardware Dealers.
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MALLEABLE IRON CASTINGS
 Of superior quality, and Hardware Specialties
 in Malleable Iron made to order.
HAMMER & CO.,
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Transom
Lifter
and Lock.
 For all kinds
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 Fanlights and
 Skylights.
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 and price list.
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 Patentee and Sole Manufacturer,
 CHICAGO, ILL.

STANDARD SHAFT COUPLING SPRING.
 CHICAGO, ILL.
 July 24, '81.
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 You may enter
 our order for
 5000 sets of your
 Standard Shaft
 Coupling Springs
 (60 sets a month).
 A. A. ABBOTT
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 Side View.
 One dozen pairs, japanned,
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 Hardware or Carriage
 trades for \$1.50 per gross.
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 off 30 days, in off spot cash.
 Discount to jobbers. Splen-
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 pairs. Dealers and the
 trade also supplied by the
 E. D. Clapp Mfg. Co., Au-
 burn, N. Y., and Wilcox &
 Howe, Birmingham, Conn. Perfect Anti-Rattle and
 Shaft Bolt Lockers. Look next on a buggy. Sold
 by all hardware dealers everywhere. Orders, large
 or small, filled promptly.
A. G. MOREY & CO., 90 Randolph Street,
 (McCormick Block), CHICAGO,
 Manufacturers for U. S. & Canada, under Letters
 Patent.

The Patent Combined
Dinner Pail and
Lantern.
 The most perfect Dinner Pail
 in the world. Hot coffee for
 dinner and a lantern at night.
 Manufactured by J. S. HAIGHT,
 FORT CHERRY, N. Y.
 Sent by express on receipt of
 \$1.00. Agents wanted.
Brass Molders and Manufacturers
 write for sample and price of Fine Red Brass
 Molding Sand.
W. J. CHAPMAN, Baltimore, Md.

INDUSTRIAL ITEMS.

MASSACHUSETTS.

A number of gentlemen have been negoti-
 ating with Anthony & Cushman, of Taunton,
 for the purchase of their present tack fac-
 tory, soon to be vacated. The parties con-
 template running a tack concern of 50
 machines.

The Orange Sewing Machine Co. are ship-
 ping 400 machines per day.

The Holyoke Machine Co. have just made
 the casting for a Boyden water-wheel of
 9000 pounds weight, for parties in Lowell.

The Iron Works rolling mill at Fall River
 commenced operations on Monday, after
 having been shut down for repairs about
 ten days. In order to meet the require-
 ments of the company the mill will be run
 both night and day.

The Mason Machine works, Taunton, of
 which William Mason, is president, William
 H. Bent, treasurer, and Frederick Mason,
 agent, are well-known builders of cotton
 machinery, the president of the company
 being a veteran in the business, which was
 started by him in 1842. They now employ
 upward of 900 men in the various depart-
 ments of their works, and are running sharp
 up to their fullest capacity with large orders
 ahead. Among other orders are some
 34,000 spindles of ring spinning frames for
 the Border City Manufacturing Co., Narra-
 gansett Mills, Whittenton Manufacturing
 Co., Canoe River Mills, R. W. Lord & Co.,
 F. Shroder & Co., and John Farnum & Co.
 Most of them have the Mason patent spin-
 dle; also over 40,000 spindles of Mason
 mules for the Peabody Mills, Ashland Co.,
 Potomac Mills, Cohannet Mills and China
 Manufacturing Co., besides large orders
 for their regular work such as cards, rail-
 way heads, drawing frames and looms.

Boston Commercial Bulletin.
 The Walworth Manufacturing Co., First
 street, South Boston, are dredging a chan-
 nel from their wharf to the main channel in
 the harbor, at an expense of \$3000. They
 are also erecting a large brass foundry
 and making other improvements. The
 foundry building is to be of brick, made
 from the brick of the old chimney and ovens
 formerly used by the glass works.

The Tremont and Suffolk Mills, at Lowell,
 have given another order to the Lowell Ma-
 chine Shop for 38 Foss & Pevey cards.
 These mills are now running, and have
 ordered 222 cards of this pattern.

The Robinson Iron Company, of Plymouth,
 have so much work on hand that they are
 running the entire 24 hours, and have em-
 ployed a gang of men from East Taunton
 for a night gang.

CONNECTICUT.

The Harvey Manufacturing Company at
 Falls Village is doing an extensive business
 in turning out bolts. They are now aver-
 aging about 7000 per day, and expect soon
 to double that number. There have lately
 been added to the works several new ma-
 chines, and they soon expect to put in a large
 and powerful engine.

NEW YORK.

The new eight-pot furnace of the Bush-
 wick Glass Works, Brooklyn, will go into
 operation on the 1st of September next.
 This is the largest furnace yet erected by
 the proprietors, the pots being of much
 larger capacity than those generally used in
 glass factories.

Work has been resumed at the Star Forge
 of the Albany Iron Works.

The large furnace of Rumsey & Co.,
 Seneca Falls, is being enlarged by an addi-
 tion 60 feet in length by 44 in width. The
 firm is continually adding to its facilities for
 manufacturing, and with all its efforts in
 this direction, it is found impossible to keep
 up with the orders for goods which are being
 received from nearly all parts of the world.
 The enlargement of the furnace became a
 necessity, in order that Messrs. Rumsey &
 Co. could fill their orders much more
 promptly. When completed it will be one
 of the largest foundries in the State.

The United States Mineral Wool Company,
 with offices at No. 16 Courtlandt street,
 New York, was organized June 9, and is
 now fully engaged in the manufacture and
 sale of mineral wool. This article is becom-
 ing a staple in the building materials trade,
 and has lately been brought to a high grade
 of quality. It is used to prevent condensa-
 tion in steam cylinders and pipes, to protect
 water pipes, to protect hot-blast pipes, as a
 non-conducting packing for ice boxes, for
 wiping wire after it has passed through tin
 or zinc baths, for lining floors, and as a
 mold, and vermin-proof filling of walls
 and partitions. It is one of the best and
 most economical non-conducting materials
 ever made.

PENNSYLVANIA.

Buckwalter & Co. have commenced the
 erection of a pattern shop at Roystersford,
 to be 20 by 50 feet, built of brick, with iron
 window frames and shutters.

It is now an established fact that the West
 Hamburg Rolling Mill, at Hamburg station,
 on the Reading Railroad, will continue in op-
 eration. The mill was recently inspected by
 W. E. C. Cox, Esq., Superintendent of the
 P. & R. Rolling Mill, this city, and Messrs.
 Nevigold and Sheids, of Bristol, Bucks
 County, proprietors of a rolling mill at the
 latter place.

Workmen are engaged to lay the founda-
 tion for a new rolling mill along the Wil-
 mington & Northern Railroad, just south of
 the borough limits of Coatesville, Chester
 county. The mill, when completed, will be
 one of the most complete in this State, and
 the machinery will be new and the most im-
 proved. The structure will be known as the
 "Worth Brothers' Model Mill," and will em-
 ploy a number of men.

Schmertz & Sons' window glass house, in
 Brownsville, have the fires lit and com-
 menced work September 1st. The men have
 had all the rest they want, and look more
 like grangers than glass workers, after two
 months hunting and fishing.

Rodman Furnace was put in blast on the
 24th ult. and is doing well.

No. 3 Furnace of the E. & G. Brooke Iron
 Company, Birdsboro, has been blown out for
 repairs. The stack will be relined and the
 engine and boiler undergo a thorough in-
 spection.

Should the present drought continue much
 longer, the output of coal from Schuylkill
 County will be considerably reduced below
 the quantity of coal which would be shipped
 were there a plentiful supply of water. Two
 collieries, Turkey Run and Shenandoah City,
 both located in Shenandoah, and operated
 by the Reading Company, have been com-
 pelled to suspend for want of water. If rain
 does not soon fall, other collieries will follow
 suit. Many are hard pushed now for water
 and cannot stand the strain much longer.

The shaft of the plate rolls in the boiler
 plate mill of the Pottstown Iron Company was
 broken on Saturday, Aug. 27.

The Carbon Rolling Mill, at Weissport,
 Carbon County, is about to resume work
 again after a long idleness.

A fire broke out in a flour mill in Beaver
 Falls on the night of the 28th, which com-
 municated itself to the works of the Pittsburg
 Hinge Company, the Beaver Falls Steel Works
 and the Beaver Falls Cutlery Company's
 Works. The loss will be quite heavy on the
 Hinge Company and the Steel Works. All
 the concerns are insured. The fire is sup-
 posed to have been caused by spontaneous
 combustion.

McKee & Co., of Brownsville, are making
 a merchant iron by a new process covered
 by patent, equaling in quality the finest
 charcoal iron produced in knobbling fur-
 naces or the best imported Swedish iron,
 and is successfully used in the manufacture
 of horseshoe nails, rivets, wire, pressed
 japanned ware, &c. They are building four
 new furnaces, and find sale for all the iron
 they can produce.

PITTSBURGH AND VICINITY.

Phillips, Nimick & Co.'s Sligo mill will
 start up again this week.

Thomas Evans & Co.'s new chimney fac-
 tory, on Eighteenth street, is rapidly ap-
 proaching completion. They have fired up
 and will commence blowing on Monday
 next. Work is progressing on other parts
 of the structure.

The Pittsburgh Locomotive Works, at
 Manchester, are running full time, and have
 more orders on hand than can be handled in
 the next six months.

Bryce, Walker & Co. are running full
 time, and their new furnace is working to
 perfection. Trade is very fair.

Wm. Fortune, formerly of Fortune,
 Farnestock & Co., South Side glass man-
 ufacturers, is in the city making arrange-
 ments for embarking anew in his old busi-
 ness. The new factory will be located in
 Iowa. The exact site has not been chosen,
 two towns being now engaged in a struggle
 to get the works within their respective
 boundaries. Mr. Fortune will have associ-
 ated with him in this enterprise several
 prominent glass workers of the South Side.—
Pittsburgh Times.

Adams & Co. are running full time with
 all their furnaces, and are very busy on
 their various and extensive lines of table
 ware.

OHIO.

One of the oldest machine shops in the
 West is that of Duvall & Co., West Market
 street, Zanesville. Its history extends over
 half a century, and it has the honor of hav-
 ing kept in the van of successive improve-
 ments. Its engines—stationary, plantation
 and portable—are adapted to the most various
 requirements. Duvall & Co.'s saw mills and
 boilers hold a high and well established rep-
 utation.

Our Toledo correspondent writes: Heartley
 & Dempsey, proprietors of the Toledo Spring
 Works, where the manufacture of children's
 carriage springs and axles and wagon springs
 is carried on on a large scale, are about
 placing in a lot of new machinery—a sign of
 increasing business.—*Cleveland Trade Re-
 view.*

The Pollock Furnace, at Brier Hill, has
 been damped down for a few days in order
 that steam connections may be made with
 the new blast engine, built by the Cuyahoga
 Steam Furnace Company, of Cleveland.
 The Spiegel furnace will be blown in as soon
 as the connections with the engine can be
 completed.

A movement is on foot for another rolling
 mill in Niles, Ohio. It is proposed by 12
 skilled workmen to organize a co operative
 company.

Penneck Bros., Minerva, are building a
 new shop for wood-working machinery. It
 is 40 by 75 feet, with a wing 24 by 30 feet,
 and will be fitted with new machinery
 driven by an engine of 45 horse-power. It
 will be ready for use in about five weeks.

Reynolds Bros., Columbus, file cutters,
 employ nine hands. They are the only
 hand-cut filers in the city. They have se-
 cured a wide-spread reputation, and have
 to keep their works running night and day.

Williams & Co., Alliance, are about hav-
 ing built a one-story building for the erection
 of the heavy machinery that they are con-
 stantly constructing.

The Ohio Grindstone Company, of Cleve-
 land, are now operating 13 large quarries of
 the celebrated Ohio sandstone with a force
 of 700 men. The company have recently
 taken orders for upward of 2000 tons of
 grindstones, and the entire production of the
 company is already sold for many months
 ahead.

KENTUCKY.

Pennsylvania Furnace blow out last week
 to put in a new Gantz rock hearth.

Ashland Furnace is working splendidly,
 making over 50 tons of iron per day, using
 only raw coal for fuel.

Hunnewell Furnace is booming along as
 usual, making 18 tons of a superior grade of
 pig iron per day.

ILLINOIS.

The work at the Springfield watch fac-
 tory is constantly increasing. Beginning
 with next month it is expected that 300
 watches will be finished each day.

The American Steam Engine Works, of
 Chicago, are building a 50 horse-power en-
 gine to go to Houston, Tex.; one of the
 same power for the Hoyt & Bro. Mfg. Co.,
 Aurora, Ill.; a 20 horse-power for Sterling,
 Ill., and a large number varying from 16 to
 60 horse-power each for other parties and
 sections. They are full of orders for the
 next 60 days, and are now employing 25
 men in their works.

Last Tuesday was pay-day at the Joliet
 Steel Works, and about \$110,000 was paid
 out to the men for the July work. Com-

mencing September 1st, every department
 will open in full blast, with two complete
 sets or turns of workmen. It is expected
 the September pay-roll will reach the highest
 amount of any preceding month, and the
 names of over 2000 men will appear upon
 the roll.

The new works of the Chicago Steel
 Horse Shoe Co., at Pullman, will be running
 September 1. Between 50 and 100 men will
 be employed in them, and the company state
 that they will be able to turn out from 10 to
 15 tons of shoes a day. They are a month
 behind orders.

Warren Springer, Chicago, manufacturer
 of general machinery, is furnishing the
 Chicago and Northwestern Railway with a
 complete coal mining outfit, to be used in
 the company's new mines, now being devel-
 oped in Iowa. He is also building two
 boilers, 75 horse power each, for an iron
 mining company in Northern Michigan.

The Chicago Iron Foundry building at
 Pullman is rapidly being pushed toward
 completion. It is one of the largest build-
 ings in the new city.

INDIANA.

The Indianapolis Rolling Mill Company
 are busily engaged in changing and leveling
 the site for the steam mill. The company
 has only to arch over the creek 200 feet
 from the Mississippi street culvert, to the
 canal culvert, to make the most striking
 change, and, to an old resident, most puzz-
 ling transformation that has appeared in any
 part of the city in 40 years.

P. H. & F. M. Roots, of Connorsville, man-
 ufacturers of Roots' new iron blower, are
 now employing 60 men in their works, are
 six weeks behind on orders, and run their es-
 tablishment day and night. The works will
 soon be enlarged and the capacity increased
 one-third.

TENNESSEE.

Southern States Coal, Iron and Land Com-
 pany, doing business at South Pittsburg,
 Marion County, is now turning out steadily
 about 80 tons per day of pig iron, principally
 forge brands, and of superior quality. The
 furnace is sold slightly ahead. The iron is
 popular with mill men and growing in favor.

The company have extensive fire-brick works
 in operation, putting out 8000 bricks daily.
 These works have supplied linings and ma-
 terial for repairs of the following furnaces:
 Warner Furnace, Hickman County, Tenn.;
 the new stack building at Birmingham, Ala.;
 Woodstock Furnace, Round Mountain Fur-
 nace, Bibb Furnace, Alice Furnace, Bir-
 mingham, Ala. Their own stack, lined with
 these bricks, has been in blast 27 months,
 and their coke ovens have been steadily used
 three years. The company also have a large
 and well-supplied foundry, with machine
 shops attached, probably the largest in the
 South. This department has contracts in
 hand for more than 1600 tons of castings,
 mostly for Southern railways. These works
 will furnish all the castings, except wheels,
 for the new car works at Knoxville. The
 foundry does a large business in hollowware
 for the country trade. In these lines they
 have contracts ahead for several hundred
 tons. They recently remodeled the Alabama
 Furnace, near Taladega, and are now under
 contract for the construction of large
 chemical works for a company at Atlanta,
 Ga. Another department is the extensive
 car shops, which turn out box and flat cars,
 and have orders for several hundreds from
 Southern railroad companies. The company
 now employs about 1200 men at South Pit-
 tsburg, and at their mines, ovens and other
 works elsewhere. Their employees and
 those dependent on their business activity
 form quite a village, which is gradually
 growing into a handsome town, supplied
 with all the necessary conveniences and
 many of the luxuries of larger places. Their
 second stack will soon be ready to blow in,
 and its operation will add to the number of
 employees, and increase the output of pig
 iron about 100 tons daily. This company's
 operations have been conservative and
 marked by the strictest business integrity.
 Its venture was made on its own capital, no
 part of its property being bonded. It has
 done much toward demonstrating the capac-
 ity of the Southern field for the manufac-
 ture of good iron cheaply. The first move-
 ment was made in 1875, and the plant has
 all been put down since that time.

MISSOURI.

A new organization has recently been
 incorporated in Missouri, with a paid-up cap-
 ital of \$10,000, for the purpose of manufac-
 turing wringers. The corporation will be
 known as the Triumph Wringer Company,
 of St. Louis, of which C. H. Spencer is the
 president; A. T. Harlow, secretary, and E. H.
 Israel, manager. They expect to be prepared
 to supply the trade within a few weeks, and
 guarantee the best of workmanship and
 material. Every machine will be thoroughly
 tested before leaving the factory.

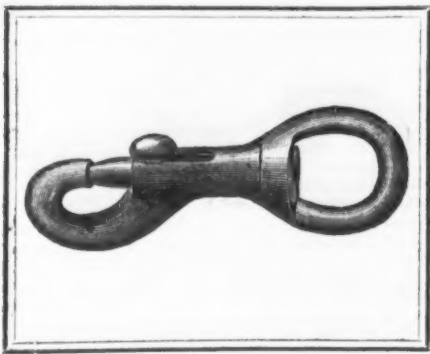
We clip the following from the St. Louis
Age of Steel, regarding the industries in that
 city: P. P. Manion shipped a car load of
 machinery to Texas on Wednesday. J.
 Boyer is building a machine shop on Bat
 street, between Collins and Broadway. D.
 Kerwin has just planted a fine steam ham-
 mer in his iron-working establishment on
 North Levee. The Missouri Car and Foundry
 Company are building 400 box and flat cars
 for the Gulf, Colorado & Santa Fe Railroad.
 The freight depot of the Missouri Pacific
 Railroad, at Poplar and Seventh streets, is to
 be illuminated with electric light. Work
 has been begun clearing away the debris of
 the Gage & Horton Stove Works, destroyed
 by fire on Sunday last, preparatory to re-
 building that establishment. The convert-
 ing department of the Vulcan Steel Works
 has been temporarily closed, pending some
 repairs, alterations and improvements being
 made there.

MICHIGAN.

The following table exhibits, in gross tons,
 the total lake shipments of iron ore in the
 present season, up to and including Aug. 17,
 together with the amount shipped during
 the corresponding period last year:

Where from.	1880.	1881.
Escanaba.....	668,290	776,118
Marquette.....	396,793	377,172
L'Anse.....	30,189	28,896
Total.....	1,095,272	1,182,186

An increase of 100,148 gross tons.—*Mar-
 quette Mining Journal.*



COVERT MANUFACTURING COMPANY,



WATERVLIET ARSENAL, WEST TROY, N. Y., Nov. 9, 1880.
The "Covert Snap" has been used in large quantities in the military service by our troops in the West, and has given great satisfaction, as far as known, to the Ordnance Department.
P. V. HAGNER,
Brevet Brig.-General U. S. A., Col. of Ordnance.

SOLE MANUFACTURERS OF



NEW YORK, August 5, 1878.
COVERT MANUFACTURING CO.—Gents:
Having used your Breast Chains sent here for trial, to be paid for if they proved satisfactory, I would say that they have given perfect satisfaction, and as they cost one-half less and will last much longer than straps, we wish to settle for same, and shall continue to buy and use them in place of straps. We have used your Harness Snaps a long time, and have adopted them as being the best in the market.
Yours truly,
HORACE DENNETT,
Supt. Knickerbocker Ice Co.

CHICAGO, ILL., Sept. 10, 1878.
COVERT MANUFACTURING CO.—Gents:
Your inquiry in regard to the Snaps sold us some two years since, we cheerfully say they proved to be the best we have ever used, and we have bought no other kind since, but have been buying your goods of jobbers here, and have told them when they get them thoroughly introduced they would not need to carry any other kind. We are satisfied no one having used them will buy any other. Yours respectfully,
M. W. SQUIRES,
Supt. North Chicago City R. R. Co.

COVERT'S PATENT HARNESS SNAPS,

CHAIN

AND

ROPE GOODS

ROPE HALTERS, HORSE AND

CATTLE TIES, HALTER LEADS, &c.

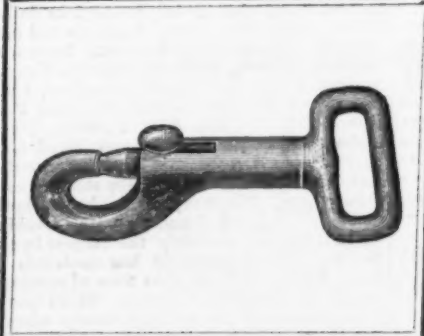
These goods are sold by all leading jobbers in General and Saddle-Hardware, and the same discounts given from the list to the trade as when purchased direct from the factory.

All Manufactured by Machinery, and are the Best and Cheapest in the World.

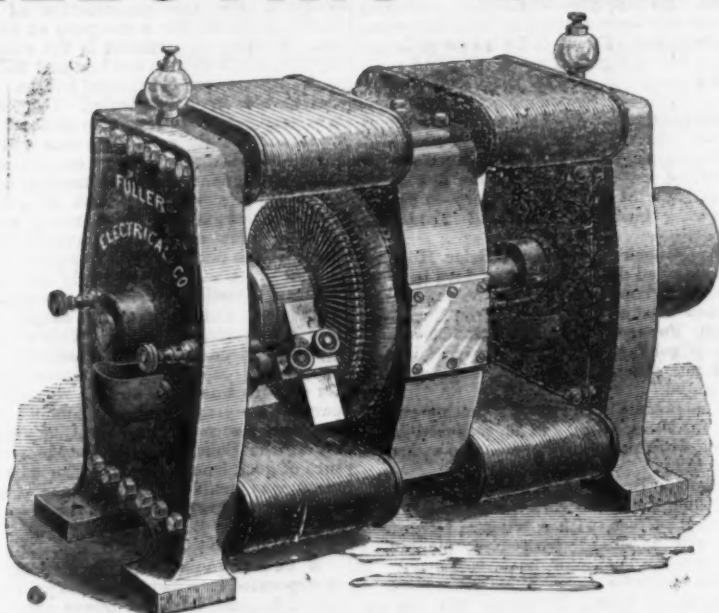
SEND FOR ILLUSTRATED CATALOGUE AND PRICE LIST.

COVERT MANUFACTURING CO.,

West Troy, N. Y.



ELECTRIC LIGHT.



THE FULLER ELECTRICAL COMPANY, having perfected their system of Electric Lighting, are prepared to furnish the Improved Gramme Dynamo Electric Machines and Electric Lamps, either for single lights or for from 2 to 20 lights in one circuit. This apparatus is unexcelled for durability, steadiness of light and economy of power, and requires less attention than any other.

For price list and further particulars apply to
THE FULLER ELECTRICAL COMPANY,
44 East Fourteenth Street, NEW YORK.

The Iron-Masters' LABORATORY.

Exclusively for the
Analysis of Ores of Iron, Pig and Manufactured Iron, Steels, Limestone, Clays, Slags and Coal for Practical Metallurgical Purposes.
No. 339 Walnut St., Philadelphia.
With Branch at Warrenton, Virginia,
J. BLODGET BRITTON.

This laboratory was established in 1866, at the instance of a number of practical Iron Masters, expressly to afford prompt and reliable information upon the chemical composition of the substances above mentioned, for smelting and refining purposes. The object being to make it at once a convenient, practically useful, and comparatively inexpensive adjunct to the Furnace, Forge and Rolling Mill.

CHARGES TO IRON WORKS.

For determining the per cent. of Pure Iron in an ordinary Ore..... \$4.00
For the per cent. of Pure Iron, Sulphur and Phosphorus in do..... 12.50
For each additional constituent of usual occurrence..... 1.50
For those of unusual occurrence or difficult to determine, the charge must necessarily depend upon circumstances.
For determining the per cent. of Sulphur or Phosphorus in Iron or Steel..... 7.50
For each additional constituent of usual occurrence..... 6.00
For the per cent. of Carbonate of Lime, and insoluble Silicious Matter in a Limestone..... 2.00
For the per cent. of Water, Volatile Combustible Matter, fixed Carbon, and Ash in Coal..... 12.50
For determining the constituents of a Clay, Slag, Coke, or of an Ash in Coal the charges will correspond with those for the constituents of an ore.
For a written opinion or letter of instruction the charge must necessarily depend upon circumstances.
Printed instructions for obtaining proper average samples for analysis furnished upon application.

LIGHTNING HAY KNIVES.

WEYMOUTH'S PATENT.



This knife is the best in use for cutting down hay and straw in mow and stack, cutting fine feed from bale, cutting corn stalks for feed, cutting peat and ditching marshes.
The blade is best cast steel, spring temper, easily sharpened, and is giving universal satisfaction. A few moments' trial will show its merits, and parties once using it are unwilling to do without it. Its sales are fast increasing for exports as well as home trade, and it seems destined to take the place of all other Hay Knives.
They are nicely packed in boxes, one dozen each of 50 pounds weight, suitable for shipping by land or water to any part of the world.

MANUFACTURED ONLY BY

HIRAM HOLT & CO.,

East Wilton, Franklin Co., Maine.

For sale by the Hardware Trade generally.

THE FRENTRESS STEEL

BARB WIRE.

Patented Dec. 14, 1875.

Reissued May 2, 1877.



The most popular Barb Fence Wire now offered in market, at prices which cannot be undersold. Send for Price Lists and Circulars.
MANUFACTURED BY THE
ST. LOUIS WIRE FENCE CO., | The Frentress Barb Wire Fence Co.,
814 & 816 N. Second St., St. Louis, Mo. | East Dubuque, Illinois.

E. C. ATKINS & CO.



SPECIALTY:
LARGE CIRCULAR SAWS.

SOLE MANUFACTURERS
OF THE GENUINE
SILVER STEEL DIAMOND X CUT SAW

INDIANAPOLIS, IND.

NEW DESIGN.

'Miller's 6-Lever'

Cast Brass Padlocks, with or without Tinned Iron Chain or Nickel Plating. Awarded "First Order of Merit" at the International Exhibition at Melbourne, 1881.

Keys will not pass unless so made to order. The most secure, most durable and cheapest Padlock extant. Master-Keyed Padlocks to order in sets of any number required.

New price lists ready.

D. K. Miller Lock Company

821 Cherry Street,

PHILADELPHIA, PA.



FRASSE & CO.,
Importers of
PETER STUBBS' BRIGHT STEEL
WIRE, TOOLS, FILES AND
BAR STEEL.
Send for Price List. P. O. Box 467.
55 Chatham St., N. Y.

DE-OXYDIZED BRONZE.

DE-OXYDIZED BRONZE (patented) is an alloy of **LAKE COPPER** and best **ASIATIC TIN** in any proportion required, so as to be either as ductile as copper, as tough as iron, or as hard as steel, according to the proportion of Copper and Tin used.

The process of making the alloy is what constitutes its superiority over any other known alloy of Copper and Tin or any other Bronze composition. The castings made from this metal, owing to its perfect fluidity when melted, possess great density, perfect soundness and homogeneity. Unlike certain bronze and other compositions, it can be handled without the least difficulty by any ordinary founder, as it flows like oil in pouring.

Thus the necessity and trouble of shipping patterns, the delay in receiving castings and the expense of the double charges of freight or express, such as attend the obtaining, in many cases, of Phosphor Bronze, are entirely avoided by ordering **D. O. B. in ingots**. Where this metal has superseded other compositions of similar character, it has endured three times as long. In a word, we claim that **De-Oxydized Bronze** not only has none of the objectionable features attributed to similar compositions, but that it possesses all their good qualities in addition to its own merits, and advantages peculiar to itself, such as the following summary will make clear:

1. ITS GREAT CONVENIENCE IN HANDLING as compared to Phosphor Bronze.
2. We claim for it SUPERIOR ANTI-FRICTION QUALITIES to any other known Brass or Bronze.
3. GREAT MALLEABILITY AND TENACITY.
4. Its homogeneousness and smoothness of surface render it capable of the HIGHEST POLISH.
5. As before mentioned, we claim for it UNEQUALED ENDURANCE.
6. We claim that JOURNALS MADE of D. O. B. REQUIRE ONE-FOURTH LESS LUBRICATING MATERIAL than any other composition yet known.

Finally, this metal has never failed to give more than satisfaction wherever used. To sustain our statements, the following testimonials will suffice:

Henry Disston & Sons, Saw, Tool, Steel and File Works, Front and Laurel Streets, Philadelphia Smelting Company, City:

PHILADELPHIA, October 4, 1879.
GENTLEMEN: After a trial of eighteen months of your "DE-OXYDIZED BRONZE" as Journal Boxes in our Rolling Mill, where great pressure is required we take pleasure in recommending it as being superior to any we have heretofore used. Very truly,

Office of Eagle Iron Works, 1162 North Third Street,

Philadelphia Smelting Company:

PHILADELPHIA, August 29, 1879.
GENTLEMEN: In reply to yours of the 28th inst., we beg to say that we have been using your "DE-OXYDIZED BRONZE" for over a year, and have found it better than any composition boxes we have used; and as long as

you continue to make it the same quality, we shall use no other metal in our Engine Boxes. We therefore take pleasure in recommending it to Engine Builders in general.

Yours respectfully,

HOFF, FONTAINE & ABBOTT.

Office of Union Brass Manufacturing Company,

CHICAGO, Dec. 23, 1880.

Philadelphia Smelting Company, Limited, Twelfth and Noble Streets, Philadelphia, Pa.:

DEAR SIR: In reply to your inquiry of yesterday as to our opinion of "DE-OXYDIZED BRONZE" for Railway Coach Trimmings, I beg to submit that we have used it up to present writing for the trimming of something over 100 coaches. One marked peculiarity of this metal, when highly finished, is non-liability to abrasion, and its non-affinity with the gases of the atmosphere, which in embossed work is a great desideratum. To those willing to pay more in the first cost, we would confidently recommend "DE-OXYDIZED BRONZE" Trimmings as cheaper in the end.

Yours very truly,

J. HALL DOW, President.

This metal is used for the following purposes, and we can refer to large concerns in addition to above, through the New England and Middle and Western States, who are using it in preference to any other.

1. Engine, Car and Machinery Journals.
2. Pumps, Valves and Linings, Cylinders, Pinions, Cogs, Plungers, Crank Pins, &c.

3. Car Trimmings, Harness and Coach Furniture, House Hardware, Steam Fittings, &c.
4. Wire, Sheets, Rods and Tubes.

And for any other purpose that a handsome, durable and sound Bronze is required. We especially commend it to Railroad Companies, Car Builders, Machinists, Engineers and others requiring a Journal Metal that will stand the severest friction and the heaviest pressure.

Manufactured and for sale in Ingots and Castings by the

PHILADELPHIA SMELTING COMPANY, Limited,

S. E. COR. TWELFTH AND NOBLE STS., PHILADELPHIA, PA., U. S. A.

GENUINE BABBITT.

Our Genuine Babbitt is superior to all other makes in the market in every particular. We guarantee it to be perfect in its Anti-friction qualities in machinery AT A SPEED OF 10,000 PER MINUTE, or at 1000 TONS PRESSURE for 10 YEARS. We append below testimonials from all houses justifying us in the above claims.

NEW HAVEN, CONN., April 11, 1881.
We have used your "Genuine Babbitt" in our Challenge Rock Breaker with excellent results, and are pleased to testify to its merits for Journals, where high speed and great pressure are required.

BLAKE CRUSHER CO.

WORCESTER, MASS., April 21, 1881.
We have used your "Genuine Babbitt" about 4 years on our wood cutting machinery bearings, run at a speed of 9800 revolutions per minute, and always with entire satisfaction.

G. W. INGALLS & CO.

WORCESTER, MASS., April 23, 1881.
Having used your "Genuine Babbitt Metal" for over 4 years on machinery that runs over 9000 turns a minute, on 1 in. shaft, 3 in. journals, I can safely recommend it for all you advertise it to do. Any person wishing to see the machinery or wanting further information can call or address,

A. I. THOMPSON, Master Mechanic,
25 Hermon street.

From J. L. MARRDEN, Supt.,
FARRELL FOUNDRY AND MACHINE CO.,
ANSONIA, CONN., Aug. 17, 1880.
The "Genuine Babbitt" we have bought from you gives perfect satisfaction in our Stone Breakers. We have it working in bearings 12 in. long and 5 in. diameter. One-half the revolution of shaft there is a pressure of 900 tons. The other half 214 tons. The shaft makes from 200 to 250 turns per minute. I think this is a very severe test, yet they have been running for more than one year.

From WITHERBY, RUGG & RICHARDSON,
Manufacturers of Wood-Working Machinery,
WORCESTER, MASS., Nov. 23, 1880.
Send us 1000 pounds "Genuine Babbitt," divided into Bars, as usual. We think the continuance of our trade with you, in the face of the constant effort made by other parties to divert our patronage, is a sufficient recommendation of your goods. We speed some journals as high as 6000.

Yours truly,
WITHERBY, RUGG & RICHARDSON.

From this it will be seen that it can have no superior, or even equal, as an Anti-Friction Metal in anything manufactured. We make besides all grades of Anti-Friction Metals,

Letter A, Guaranteed at a speed of 2000.
Letter D, Used for Shafting.

Letter B, Guaranteed at a speed of 1000.
Letter E, Used for Ag'l Implements, &c.

Letter C, Guaranteed at a speed of 800.
Letter A L, For slow speed.

All our Metals are made from best Lake Copper, Asiatic Tin, Cookson's Antimony and best Refined Lead, and in all cases run free at melting heat, without drossing, and without any necessity for heating the journals into which they are poured.

MANUFACTURERS' AND MACHINISTS' NAME PLATES, REAL BRONZE, FINISHED.

Patterns from \$3 upwards, according to Size and Style. Plates, \$3 per dozen and upward, according to Size and Style.
SKETCHES FURNISHED FOR APPROVAL BEFORE MAKING PATTERNS.

We have a specialty in this line and produce a handsomer plate, at less money, than can be obtained elsewhere.

ART AND ECCLESIASTICAL METAL WORK IN BRASS AND BRONZE,
GAS FIXTURES, ALTAR CANDLESTICKS, SANCTUARY LAMPS, CHANCEL RAILS, PULPITS, &c.

PHILADELPHIA SMELTING COMPANY, Limited,

S. E. COR. TWELFTH AND NOBLE STREETS, PHILADELPHIA, PA.

Red Lights for Hotel Passages.—The St. Nicholas Hotel, New York, has adopted a feature which is in use in many Western hotels. This is the introduction of red lights in the halls. Firemen say that the greatest difficulty guests experience in a burning building is in finding their way to the stairways. The passages are frequently long and tortuous, and even one quite familiar with their windings is apt to go wrong under the influence of any sudden excitement. For this reason the St. Nicholas has placed red globes on the fixtures in the halls that lead to the staircase, and white lights in those that do not. A stranger can open his door at any hour of the night, and by running along the row of red lights reach the stairs in the shortest possible time.

A movement is in progress to form a combination of oil refiners not under the control of the Standard Oil Company. Two meetings of the outside refiners, as they are termed, have recently been held in Pittsburgh and a third last week at Cleveland, when an organization was effected. The Standard Company seems to be losing its power. A short time ago it held a rod of terror over the trunk lines of railroad and compelled them to do its bidding, give it such rates for transportation as it demanded and charge outside refiners an extortionate rate. Now the railroads, with the exception of the Louisville and Nashville, have found the courage to refuse their demands and to agree to put all refiners on the same footing. At one time, we believe, all but one or two refiners in the country were controlled by the Standard. Now, of the 50,000 barrels of crude oil refined daily in the United States fully one-third is the product of refiners not controlled in any way by the Standard. In Philadelphia a large "outside" refinery is under way. Cleveland, one of the Standard's strongholds, contains eight independent refiners, Pittsburgh three, Franklin two, Buffalo two, Oil City two, Titusville two, Chester, Pa., one, and Bayonne, N. J., one. It must not be supposed that the Standard will submit without a struggle. It is too strong.

It is noticed that the outgoing steamers for Europe are taking a great variety of manufactured articles, such as machinery, revolvers, dental chairs, hardware, organs, stationery, furniture, pumps, agricultural implements, casings, photo goods, cutlery, drugs, crucibles, &c.

A German inventor, Erichson, is bringing out a machine for rolling instead of tapping bolts and large screws, and it is stated that he has been quite successful with his new method, the chief characteristic of which is that no material is removed by cutting.

Special Notices.

SECOND-HAND AND NEW MACHINERY.

September, 1881.

The following New and Improved Machinery:

1. 12 in. swing x 6 ft. Screw Cutting Lathes. Sept. 1.

2. 12 in. swing x 6 ft. Screw Cutting Lathes. Sept. 1.

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Special Notices.

THE PAINT CREEK MINING PROPERTIES

Of Kanawha County, West Virginia.

PAINT CREEK MINING CO., 10,000 acres.

(On west side of Paint Creek).

WACOMAH MINING CO., 4,700 acres.

(Adjoining the lands of the other Co., but mainly on east side of Paint Creek).

PAINT CREEK RAILROAD CO.

(From mouth of Paint Creek up the same).

All under one management, with same directors and same stockholders holding same ratio of interest in each company.

L. L. CONRAD (of Baltimore), President.

GEO. W. RIGGS (of Washington), Treasurer.

DIRECTORS:

L. L. CONRAD, of Baltimore.

GEO. W. RIGGS, of Washington.

H. H. PARKER, of New York.

JOHN S. BARBOUR, of Alexandria, Va., President Virginia Midland Railroad.

JAMES F. PATTON, of Union, Monroe Co., W. Va.

WM. H. EDWARDS, of Coalbush, Kanawha Co., W. Va.

ISAAC N. SMITH, Charleston, Kanawha Co., W. Va.

ISAAC N. SMITH, Solicitor.

OSCAR A. VEAZEY, Engineer.

Paint Creek, Kan. Co., W. Va.

These companies have been organized for the development of the valuable coal lands owned by them. They are now constructing a first-class railway through the properties, having 100 miles in the pool above Rock and Dam No. 3, part of the improvements now being constructed by the United States Government on the Kanawha River. This railway will be completed and equipped for transportation of coal in September, 1881. It crosses the C. & O. R. R. and connects with it, so that shippers will have every facility for river and rail trade. The companies are prepared to make leases to reliable parties, and to ship the coal of their lessees to river and rail upon most favorable terms.

Their Canal, Spill, Bituminous and Coking Coals are unequalled in quality, quantity and size of workable seams, the principal Spill Coal seam averaging ten feet.

Applications for leases may be made to the President direct or through any of the Directors.

More particular information given upon request by mail or otherwise to L. L. Conrad, President, 16 Lexington street, Baltimore, or Isaac Smith, Charleston, Kanawha County, W. Va., Solicitor of the companies.

Second-Hand & New Machinists' Tools.

In Store Aug. 3, 1881.

Two Car Axle Lathes. Hewes & Phillips. New.

One 25 in. x 13 ft. Horizontal Boring Lathe. Pond.

One Engine Lathe, 36 in. x 14 ft. Good order.

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Special Notices.

Rolling Mill for Sale or to Lease.

The Real Estate, Machinery, Fixtures and Tools of the Ligonia Iron Company (formerly Portland Rolling Mills) are offered for sale, or will be leased to satisfactory parties.

The property of the company consists of 60 acres of land at tide-water in the town of Cape Elizabeth, Cumberland Co., within ten minutes' drive of the city of Portland. Besides the mill buildings, the company owns 35 tenements in 25 buildings, one hall used for church purposes, two stores and a thoroughly well-fitted office, with fire-proof vault and all modern improvements. The buildings are in good repair.

The mill contains one 10-inch train and one 18-inch train, with all the machinery appertaining for the manufacture of rails and bar iron. With a small additional outlay the machinery could be fitted for rolling steel rails from imported bloom, the capacity of the mill being about 25,000 tons per annum.

The property is provided with a thoroughly built wharf, at which vessels of 500 tons capacity can lie at low water, and being directly connected by rail with all the railroads centering at Portland, is probably the most desirable situation for the manufacture of steel rails in New England. Address:

LIGONIA IRON CO.,

Portland, Maine.

New and Second-Hand

MACHINERY.

One Horizontal Engine, 15 1/2 in. x 30 in. Todd & Raf.

One Horizontal Engine, 3 in. x 6 in.

One Beam Corliss Engine, 500 H. P.

Two Horizontal Return Tub. Boilers, 100 h. p. each.

One Hor. Tubular Boiler, 6 ft. x 14 ft. 67 1/2 in. tubes.

Two Hor. Tub. Boilers, 4 1/2 ft. x 13 1/2 ft., 43 1/2 in. tubes.

One Locomotive Steel Boiler, 30 h. p.

MACHINISTS' TOOLS.

Twelve Lathes, 22 x 12. New.

Ten Lathes, 18 x 8. New.

One Cameron Pump, No. 2.

One Tapping Machine, 6 in. Saunders' Sons.

One Root Gas Exhauster, No. 14.

One Planer, 24 in. x 8 ft. Pond.

Two 10 in. Shaping Machines, Gould's.

One Milling Machine, Wood & Light.

One Tapping Machine, 6 in. Saunders' Sons.

One Hydraulic Press, 8 inch ram.

One 100-ton Hydraulic Press, 10 inch ram.

One 100-ton Hydraulic Press, 10 inch ram.

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Trade Report.

Office of The Iron Age.
WEDNESDAY EVENING, AUGUST 31, 1881.

Early in the week the markets were unsettled by disquieting reports respecting the condition of the President, of which the bears were not slow to take advantage; and the simultaneous advance in the rates of discount by the Banks of England and France to 4%, followed by an advance to 5% by the Imperial Bank of Germany, had a depressing effect. Thus far the action of the banks has not had its intended effect in arresting the movement of gold to this country. On Friday, in the stock market, the bull leaders apparently obtained control, and there was a buoyant tendency, prices generally being $\frac{1}{2}$ @ $2\frac{1}{2}$ above those of the previous day. On Saturday the advices from Washington in regard to the low condition of the President had little perceptible effect. Prices were generally higher and money was easy. Government bonds were firm for the 4s and a fraction lower for the 5s, on reports that the Secretary of the Treasury will shortly call in a considerable amount of the extended bonds for redemption. On Monday there was a further advance in the issues which it is expected the Secretary will call in September, taking the highest numbers first, as becomes necessary under the law, viz., the $3\frac{1}{2}$ % extensions of 5% and 6% bonds, the 4s and 4 $\frac{1}{2}$ %. To-day it is observed that the Stock Exchange markets are much less active than yesterday, and the share speculation has resulted in lower prices.

The market for foreign exchange is dull. The posted rates for prime bankers' sterling remain 4.80 $\frac{1}{2}$ @ 4.84; the actual rates are 4.79 @ 4.79 $\frac{1}{2}$ and 4.82 $\frac{1}{2}$ @ 4.83 $\frac{1}{2}$, with cable transfers 4.83 $\frac{1}{2}$ @ 4.83 $\frac{1}{2}$ and prime commercial bills 4.77 $\frac{1}{2}$ @ 4.77 $\frac{1}{2}$.

Money through the week has ranged from 3 to 6% on call, but the fair closing quotation is 5 to 6. The rate at bank is 6%. Prime mercantile paper is 5 @ 6%.

British consols are down to 93 $\frac{1}{2}$ @ $\frac{1}{2}$ for money from 99 3/16ths, and to 99 $\frac{1}{2}$ for the account from 99 3/16ths, due to apprehension of impending bullion withdrawal and reported sales by bankers. Another immediate advance of sales by the Bank of England is anticipated.

As above noted, the stock market for the week closes at an advance, compared with current quotations one week ago. The principal changes are as follows: Advanced—Louisville and Nashville, 3; Western Union, 2; St. Paul, 2 $\frac{1}{2}$; New Jersey Central, 3 $\frac{1}{2}$; Delaware, Lackawanna and Western, 3; Central Pacific, 2 $\frac{1}{2}$; Ohio Central, 2 $\frac{1}{2}$; Lake Erie and Western, 2 $\frac{1}{2}$; Peoria, Decatur and Evansville, 2 $\frac{1}{2}$; Cleveland, Columbus, Cincinnati and Indianapolis, 4; Rock Island, 3 $\frac{1}{2}$; Union Pacific, 3 $\frac{1}{2}$; Texas Pacific, 3 $\frac{1}{2}$; Missouri, Kansas and Texas, 2; Denver and Rio Grande, 3 $\frac{1}{2}$.

It is expected that the public debt statement for August will show a reduction of \$14,000,000.

The exports of domestic products from the port of New York are again very low, due to reprehensible speculations in the West, for which money is being absorbed in large amounts. The total exports of domestic products from the port since January 1 this year are \$260,691,725, against \$266,924,332 last year.

The importations of specie and bullion at this port during the week ending Aug. 26 were \$201,531, consisting of \$214,621 in gold and \$76,910 in silver, as against a total of \$5,462,510 for the week ending Aug. 28 last year. The importations since the 1st of January and since the 1st of August compare as follows with the movement during the corresponding periods last year:

	Since January 1, 1881.	1880.
Gold.....	\$30,056,876	\$10,779,965
Silver.....	2,910,819	3,643,013
Total.....	\$32,967,695	\$14,422,978
	Since August 1, 1881.	1880.
Gold.....	\$1,438,617	\$8,805,598
Silver.....	156,890	448,307
Total.....	\$1,595,507	\$9,253,905

The bank statement shows the effect of the comparative stringency in a contraction of \$6,173,000 in the loans and discounts, as the reserves are again deficient, while a year ago they were \$6,643,000 above the legal minimum. But the coming week may show an important improvement. The proceeds of the redemption of the coupon and registered 5s may be realized to the extent of several millions, and a good portion of the \$9,000,000 of gold in transit from Europe will have arrived.

The following is an analysis of the bank totals of this week compared with that of last week:

	Aug. 20.	Aug. 27.	Comparison.
Loans.....	\$349,542,800	\$343,369,500	Dec. \$6,173,300
Specie.....	67,138,400	62,151,400	Dec. 4,987,000
Legal T'd's	15,848,800	16,310,900	Inc. 462,100
Tot. reserve	88,930,000	78,373,300	Dec. 10,556,700
Deposits.....	334,795,600	323,721,300	Dec. 11,074,300
Reserve required.....	83,698,900	80,930,325	Dec. 2,768,575
Surplus.....	777,700	2,568,025	Inc. 1,790,325
Circulation.....	19,566,000	19,590,900	Inc. 24,900

Government bonds at the close were strong at the following quotations:

	Bid.	Asked.
U. S. 4 $\frac{1}{2}$ % 1891 registered.....	112 $\frac{1}{2}$	113 $\frac{1}{2}$
U. S. 4 $\frac{1}{2}$ % 1891 coupon.....	114 $\frac{1}{2}$	115 $\frac{1}{2}$
U. S. 4% 1907 registered.....	115 $\frac{1}{2}$	116 $\frac{1}{2}$
U. S. 4% 1907 coupon.....	116 $\frac{1}{2}$	117 $\frac{1}{2}$
U. S. Currency 6s 1890.....	131	132
U. S. Currency 6s 1897.....	132	133
U. S. Currency 6s 1907.....	133	134
U. S. Currency 6s 1907.....	134	135
"Sixes" continued.....	101 $\frac{1}{2}$	101 $\frac{1}{2}$
"Fives" continued.....	101 $\frac{1}{2}$	101 $\frac{1}{2}$

The following are the closing quotations for mining stocks:

	Bid.	Asked.
Amie.....	35	36
Alcoa.....	6.25	6.25 $\frac{1}{2}$
Alta Mont.....	1.00	1.00
Bechtel.....	1.30	1.40
Bell Isle.....	28	28
Buckeye.....	8	9
Bull Dog.....	8.85	8.85
Boulder.....	22	22
Boston C.....	10	10
Bradshaw.....	2.10	2.10
California.....	1.00	1.00
Climax.....	44	44
Consolidated Imperial.....	1.50	1.75
Consolidated Pacific.....	25	25
Consolidated Virginia.....	1.00	1.00
Chrysolite.....	6.00	6.00 $\frac{1}{2}$
Cont. Ariz.....	2.00	2.10
Cherokee.....	1.10	1.20
Dahlonega.....	5	6
Findley.....	31	33
G. Placer.....	40	40
Granville.....	8.80	8.80
Great Eastern.....	5	5
Green Mountain.....	5.12 $\frac{1}{2}$	5.25
Hukill.....	65	75
Horn Silver.....	13.50	15.00
Hibernia.....	2.15	2.25
Iron Silver.....	2.15	2.25
Laurens.....	28	28
Leadville.....	1.50	1.50
Little Pitts.....	2.50	2.50
L. Chief.....	2.35	2.40
Mar. Pref.....	4.50	4.50
Moose.....	80	80
Nevada.....	40	43
North Star.....	90	90
Ori. and Mill.....	90	90
Rappah'k.....	80	82
Robinson.....	12.12 $\frac{1}{2}$	12.37 $\frac{1}{2}$
R. Sun.....	25	25
Red Elephant.....	18	19
S. Nevada.....	16.50	16.50
Coltress.....	21.00	21.00
Standard.....	4.00	4.00
Silver Cliff.....	1.50	1.55
Sutro.....	2.50	3.00
Spr'g Val.....	2.50	3.00
Stormont.....	3.55	3.55
S. Bulwer.....	25	28
South Hill.....	80	80
St. L. No. 1.....	1.00	1.00
St. L. No. 2.....	1.00	1.00
St. L. 1 and 2.....	4.15	4.25
Tioga.....	33	38
Unadilla.....	8	8

GENERAL HARDWARE.

Some apprehension is felt that the business of the country will suffer considerable curtailment owing to the continued drouth, which in some sections is very serious, and has already caused much damage and loss to growing crops. The demand for General Hardware during the week is spoken of as satisfactory, and the supply of Mechanics' Tools continues inadequate to the requirements of the trade.

Foreign Hardware, although in fair request, is not as active as of late. Values are steady and unchanged.

H. Knickerbacker, manufacturer of Blood's Scythes, Edge Tools, &c., issued a card under date of the 27th instant, announcing that in consequence of increased cost of material and labor he was obliged to advance prices of Axes and Tools, and that all previous quotations were withdrawn. Graham & Haines are agents for this line of goods.

The demand for Nails has been active during the week, and prices are firm. We notice unwillingness on the part of sellers to contract for future delivery, except on terms ruling at time of shipment. Assortments are fair, although some holders are short of rod. We quote rod to 60d, \$3.05 @ \$3.15, net, according to quantity.

Harvey W. Peace, proprietor of the Vulcan Saw Works, Brooklyn, E. D. N. Y., has just completed additional factory buildings, increasing his productive capacity fourfold. The new buildings comprise a main building, 50 x 100 feet, four stories, with a two story extension 85 x 25 feet. The engine and boiler house is 65 x 20 feet, furnished with a 125-horse engine and a battery of boilers, with the latest improvements for insuring safety. In addition to the buildings already mentioned, he has erected a band saw shop 50 x 60 feet, three stories, supplied with a 20-horse power engine and all the latest improvements in machinery for turning out this class of work. The works are now in full operation.

The Phoenix Castor Company, Indianapolis, Ind., have issued an illustrated catalogue in which they show their large assortment of Martin's Patent Casters. These goods, although but a few years before the trade, have become a staple article. They are made in various styles and sizes suitable for light and heavy furniture, pianos, store and warehouse trucks, &c. We invite attention to their advertisement on page 18, in which a variety of these goods are illustrated. The catalogue will be mailed to the trade on application.

We noticed in our last issue an advance in the price of Cast Butts. The following are the revised prices of the Union Mfg. Co.'s, which took effect on the 24th inst.:

Office of Union Mfg. Company,
New Britain, Conn., Aug. 24, 1881.
Warehouse No. 66 Chambers St., New York.

DEAR SIR: We beg to inform you that we have this day made the following changes in discounts of Butts:

	Dis. per cent.
Cast Narrow Fast Joint Butts, Drilled and Wire Jointed, No. 82.....	40-50
Cast Broad Fast Joint Butts, Drilled and Wire Jointed, No. 82.....	40-50
Cast Narrow Loose Joint Butts, Drilled and Wire Jointed, No. 82.....	50-60
Cast Broad Loose Joint Butts, Drilled and Wire Jointed, No. 82.....	50-60
Cast Parliament Butts, Drilled and Wire Jointed, Nos. 75 and 85.....	55-60
Cast Mayer's Hinges, Drilled and Wire Jointed, No. 85.....	50-60
Japanned Loose Joint Butts, without Acorns, Nos. 54 and 57.....	50-60
Japanned Loose Joint Butts, with Japanned Tips, Nos. 55 and 58.....	50-60
Japanned Loose Joint Butts, with Silvered Tips, Nos. 56 and 59.....	50-60
Japanned Fast Joint Butts, without Acorns, Nos. 60 and 61.....	50-60
Japanned Fast Joint Butts, with Japanned Tips, No. 62.....	50-60
Japanned Fast Joint Butts, with Silvered Tips, No. 63.....	50-60
Figured Loose Pin Butts, with Japanned Tips, Nos. 64 and 65.....	55-60
Figured Loose Pin Butts, with Silvered Tips, Nos. 66 and 67.....	55-60

Figured Loose Pin Butts, without Acorns, No. 66..... 50-60
Figured Loose Pin Butts, without Acorns, Japanned, No. 67..... 50-60
Japanned Parliament Butts, without Acorns, No. 79..... 50-60
Japanned Parliament Butts, with Japanned Acorns, No. 75..... 50-60
Japanned Parliament Butts, with Silvered Acorns, No. 77..... 50-60
Terms, cash 30 days. Prices subject to change without notice.

The Kimball Shovel Co., Baltimore, Md., quote Kieser's Patent Meat Cutters as follows:

No. 55, per dozen.....	\$40.00
Gem, per dozen.....	25.00
Discount, 40 per cent.	

Butcher's Cutters.
No. 1, each..... \$75.00
No. A, each..... 350.00
Discount, 10 per cent.

Illustrations of these goods will be found in their advertisement on another page.

BRITISH IRON MARKET.

[Special Report by Cable to The Iron Age.]

LONDON, August 31, 1881.

Scotch Pig.—The demand is small and prices are weak. Quotations are unchanged, with the exception of Eglinton, which has been reduced 6d. The following are to-day's quotations:

Gartsherrie, alongside, Glasgow.....	56/
Coltness.....	56/
Glenarnock.....	56/
Eglinton.....	46/6

Lighterage from Ardrossan to Glasgow is 2/ 6 per ton.

Bessemer Pig.—The tendency to higher figures continues, with demand and large sales. The quotation for lots to-day, equal portions Nos. 1, 2 and 3, is 58/.

Manufactured Iron.—The market is quiet and prices steady, with a fair business doing. Best Staffordshire Bars are 27 @ 27/ 10/.

Steel Rails.—The demand has been steady during the week, and a fair business has been done. Prices are firm. We quote Ordinary Sections 26. 5/ @ 26. 15/, an advance of 5/.

Iron Rails.—Business is light, with prices firm. Welsh are quoted 25. 5/ @ 25. 15/.

Old Rails.—The offerings are light and sales fair. Prices are firm. We quote Old Tees 24. 2/6, c. i. f., U. S. ports.

Scrap.—Sales have been light, with offerings moderate. Prices are firm. We quote Wrought 23. 15/, c. i. f., U. S. ports.

Freights.—Steam freights from Glasgow are 10/.

IRON.

American Pig.—The condition of the Iron market is much the same as at the time of our last writing. The sales announced during the week are not large, but the deliveries have been very heavy, and the amount of Iron going into consumption is greater than it has ever been in our recollection at this period of the year. The tone of the market continues strong, and some prime brands of Lehigh are in short supply. We quote Foundry No. 1, \$24.50 @ \$25; Foundry No. 2, \$22 @ \$22.50, and Gray Forge, \$21.

Scotch Pig.—The demand for Scotch Iron has been sufficient to absorb all of the late arrivals, and we do not hear of any Iron going into store. Sales are reported of 200 tons Glenarnock, at \$22.50; 100 tons Coltness and 100 tons Eglinton on private terms, besides which a fair business in retail lots has transpired. We quote the market firm as follows: Eglinton, \$21; Carnbroe, \$22.50; Coltness, \$23.50 @ \$24; Glenarnock, \$22.50 @ \$23, and Gartsherrie, \$23.

Rails.—The demand for both Steel and Iron Rails continues active, and sales of 7000 tons Steel for early delivery at \$60 @ \$63 are reported. Iron Rails are inquired for, but it is not easy to place orders except for postponed deliveries, and it is believed that considerable pending business will be placed in foreign markets. We quote Steel at mill (1882 delivery), \$55 @ \$56, and Iron Rails, \$48 @ \$49.

Old Rails.—The condition of the market with regard to Old Rails is strong, and spot lots are not so abundant as of late. Sales are reported of 1000 tons Old Bridge Rails to arrive at \$30 and in lots, about 4000 tons Ts and Ds, at prices that have not transpired. We quote Ts, \$27.50 @ \$28, and Ds, \$30.

Scrap.—There is a fair demand for Scrap, and sales of 800 tons No. 1 Wrought, ex ship and to arrive, at \$27.50 @ \$28 are announced. We quote the same \$28, ex ship, and for prime selected, from yard, \$30.

METALS.

Copper.—Owing to the fact that the consumptive demand is developing unexpected proportions and that little stock is held by outside parties, the Copper market has assumed an advancing tendency. Occasionally dealers sell lots at prices a little lower than those demanded by the mining companies, but the amounts thus disposed of appear to be limited. During the week from 300,000 to 400,000 pounds of Lake Copper were sold at 16 $\frac{1}{2}$ ¢, for which figure it would, however, prove difficult to obtain the metal, the market being firm at 17 $\frac{1}{2}$ ¢. According to cable advices from England, no change has taken place during the week. By mail, under date of Aug. 20, we hear the following from London: "Steadiness is still the characteristic feature of this market, and what makes it appear perhaps more inanimate than it really is, is the absence of any noteworthy speculative inquiry. For legitimate account there is a very fair business doing, which is clearly proved by the good deliveries for the first half of the current month; but for some reason or other speculators are very reluctant to turn their at-

tention to this market, notwithstanding that statistics have of late from time to time shown an improvement. It may be accounted for by the heavy stocks, but it is more likely owing to the large amount of capital required, compared with that for other metals.

The bi-monthly returns of Chili produce show the imports during the first half of this month to have been 848 tons, against 2370 tons for the same time of last year, while the deliveries for the corresponding periods have been 2165 tons, against 1059 tons. The imports of other kinds of Copper during the first half of August have been 1282 tons, and the deliveries 793 tons. The stock of Chilean produce in first and second hands in Liverpool and Swansea on the 13th instant was 30,355 tons, against 31,672 tons on the 20th ult., or a decrease of 1317 tons. The Board of Trade returns for the first seven months of this year show the imports to have been 49,614 tons, against 58,302 tons in 1880, and 57,710 tons in 1879, while the exports for the same periods have been 34,793 tons, against 36,092 tons last year, and 37,775 tons in 1879. Manufactures are quoted as under: Pit and Hot rolled Flat Bottoms, 27 $\frac{1}{2}$ ¢ per pound; Cold-rolled Flat Bottoms and Pit Bottoms, with flange cut, 28 $\frac{1}{2}$ ¢; Braziers, 26 $\frac{1}{2}$ ¢ @ 32 $\frac{1}{2}$ ¢, as to size and weight; Circles, 29 $\frac{1}{2}$ ¢ @ 32 $\frac{1}{2}$ ¢; Sheets, 26 $\frac{1}{2}$ ¢ @ 29 $\frac{1}{2}$ ¢; Sheathing, 24 $\frac{1}{2}$ ¢, and Bolt Copper, 26 $\frac{1}{2}$ ¢.

Tin.—Our market shows no change since last week. The consumptive demand remains good, and is likely to increase further for the fall trade. London cables \$89. 10/ @ Singapore, \$28.75. The shipments to the United States in August are estimated at 650 tons. Those to England are unknown, but are certainly small. The arrivals here during the month of August were 550 tons, so that, estimating the consumption at 900 tons, our stocks must have been drawn upon to a considerable extent. We quote: Straits, 21 $\frac{1}{2}$ ¢ @ 21 $\frac{1}{2}$ ¢; Australian, 21 $\frac{1}{2}$ ¢; and Biliton, 21 $\frac{1}{2}$ ¢. Tin Plates.—There has been little change in the condition of the market. The consumptive demand here is reported to be good and prices are firm. Abroad the strong feeling appears to continue, and the following are given as recent cable quotations: Charcoal Bright, 20/; Charcoal Ternes, 17/ @ 19/; and Coke Tins, 16/6. We quote at the close at New York, large lines, ordinary brands, per box: Charcoal Bright, \$5.87 $\frac{1}{2}$ ¢ @ \$6.25; ditto Ternes, \$5.35 @ \$5.45; Coke Tin, \$5.12 $\frac{1}{2}$ ¢ @ \$5.15; and ditto Ternes, \$5 @ \$5.12 $\frac{1}{2}$ ¢.

Lead.—Under the impetus of a very strong consumptive demand and limited spot supplies for this time of the year, Lead is developing much strength. During the week about 500 tons of Common were sold here, at prices ranging from 4 $\frac{1}{2}$ ¢ to 4.90¢. It is now very firm, with 4.95¢ @ 5¢ asked. At St. Louis 5¢ has been paid for lots of Common Lead, and at Chicago there have been sales at 4.90¢. Refined Lead is scarce, and after the sale of a few hundred tons of Soft Missouri at 5 $\frac{1}{2}$ ¢, that price has been offered and declined. At St. Louis corrodizing brands are reported to be scarce and readily saleable at 5¢. Abroad the demand is good and prices are firm. Should the upward movement here be maintained, importations may soon be resumed, as the point where it would prove profitable to do so is fast being approached. Manufactures are quoted as follows: Sheet Lead, 7 $\frac{1}{2}$ ¢; Lead Pipe, 7 $\frac{1}{2}$ ¢; Tin-lined ditto, 15 $\frac{1}{2}$ ¢; Block Tin ditto, 35¢; Drop Shot, 7 $\frac{1}{2}$ ¢.

Spelter and Zinc.—There is little doing in Common Domestic Spelter, which is still quoted 5 1-6¢ @ 5 $\frac{1}{2}$ ¢. Though the demand is small, the stock is light and some improvement is looked forward to as soon as the fall trade sets in. Nothing has been done in foreign Spelter. Silesian remains nominally 5 $\frac{1}{2}$ ¢. Sheet Zinc is quoted 7 $\frac{1}{2}$ ¢.

Antimony.—Has not changed. Cookson is 14 $\frac{1}{2}$ ¢ @ 14 $\frac{1}{2}$ ¢.

OLD METALS, PAPER STOCK, &c.

The purchasing prices offered by dealers are as follows:

Copper, heavy.....	12 @ 13
Copper Bottoms.....	10 @ 11
Yellow Metal.....	10 @ 11
Brass, heavy.....	11 @ 12
Brass, light.....	10 @ 11
Composition, heavy.....	12 @ 13
Lead, heavy.....	10 @ 11
Tea Lead.....	10 @ 11
Zinc.....	10 @ 11
Pewter, No. 1.....	10 @ 11
Pewter, No. 2.....	10 @ 11
Wrought Iron.....	23 @ 24
Light do.....	11 @ 12
Store Plate.....	12 @ 13
Machinery do.....	15 @ 16
Grate Bars.....	5 @ 6

The prices current (prices paid by local dealers) for Rags, &c., are as follows:

Canvas, Linen.....	15¢ @ 4 c.
White Cotton, New.....	15¢ @ 4 c.
No. 1.....	25¢ @ 4 c.
No. 2.....	25¢ @ 4 c.
Seconds.....	1 c. @ 15¢
Soft Woollens.....	95¢ @ 105¢
Mixed Rags.....	25¢ @ 25¢
Quarry Bagging.....	15¢ @ 25¢
Juste Lute.....	25¢ @ 25¢
Kentucky Bagging.....	45¢ @ 45¢
Rock Stock.....	25¢ @ 25¢
Newspapers.....	15¢ @ 15¢
Waste Paper and Scraps.....	5¢ @ 5¢
Kentucky Bale Rope.....	4¢ @ 4¢

FOREIGN TRADE MOVEMENTS.

The following is a summary of the foreign trade movements for the week ended August 31:

	1879.	1880.	1881.
Total.....	\$6,514,315	\$8,711,183	\$7,441,527
Prev. reported.....	195,004,796	320,454,648	276,170,941

Since Jan. 1..... \$23,207,081 @ \$30,105,831 @ \$28,614,468

Included in the imports of general merchandise for the week were articles valued as follows:

	Pe.	$\frac{\text{£}}{\text{s}}$.
Ceaf ore, picked, 1 cwt. kegs	18	00
" " big lead	19	06
" " sheet lead	17	00
" " lead pipe.....	15	06
" " tinued inside	15	10
" " composition gas tubing	17	00
" " lead wire, to No. 12, 28; 1½ to 16	00	37
" " land leads, 28°, deep sea leads	00	36
" " improved lead washers	08	00
" " fused metal joints	08	00
" " in pipe lead shot (3 lbs. and upwards)	112 15	 5
" " patent shod	17	10
" " brass fired shot	10	00
" " in ingots	06	00
" " in bars to 4 cwts barrels	07	00
" " " " 2 cwt's. barrels	07	10
" " flumbers' solder	10	00
" ""	10	05

Brass solder	7d. to 8d.
Gen. red lead (orig. packages)	16 10
Reduced No. 1	15 10
No. 2	14 10
No. 3	13 10
Glassmakers' red lead	12 10
Pure English flake litharge, 5-cwt. casks	11 10
Pure English powdered litharge	10 10
Good foreign flake litharge	9 10
Good foreign powdered litharge	8 10
Pale powder litharge	7 10
Orange lead, powdered	6 10
Dry white lead	5 10
Genuine ground white lead	4 10
No. 1	3 10
No. 2	2 10
Sheet zinc, No. 9 upward	1 10
V. M. No. 1	1 10
Zinc nails, 1 1/2 upward	1 10
Hard spelter	1 10
Remelted spelter	1 10
Anti-friction metal—Babbitt's	1 10
Pentons	1 10
Tailors	1 10
Kingstons	1 10

FOREIGN.

FRANCE.

(Monteur des Interets Matériels.)
PARIS, Aug. 24, 1881.—Metals.—The market has been moderately active at irregular prices. Copper has declined a couple of francs. We quote: Chili Bars, 154 @ 157.50 francs per 100 kilos.; Ingots and Slabs, 162.50; Best Selected, 165.25; and pure Corcoro Ore, 157.50. Tin has been looking up; it is now 2.50 francs higher. We quote: Banca and English Refined, 247.50; Billiton, 248.50; and Straits and Australian, 245. Lead gave way 3/8; we quote the same, 36.75 @ 37.50. Spelter is higher at Havre and lower here; we quote the range, 41.50 @ 43. Iron—All prices are firm. The attitude taken by the Northern rolling mills dealers has been induced to at length advance their prices also, consumers submitting to it with good grace. Merchant iron has been selling here at 20 francs the 100 kilos.; at this figure the market is firm. The presumption is that at their next meeting the owners of rolling mills will advance the price to 21.50 at the works. We quote at Paris, large lines, Merchant Iron, 20.50; special ditto, 20; and Common Sheets, 21 @ 24.50. Old Rails can be had without difficulty at 15.50 deliverable at the works; at about this figure they have been offering liberally. The general situation in the iron trade remains cheerful and promising, one, based altogether on domestic demand, but strengthened of course by the advancing tendency in neighboring countries. The Haute-Marne district reports a steady run of orders at firm rates. At the Meurthe and Moselle blast furnaces orders for pig iron are just being renewed at 6.50 for Affinage. Longwy quotes 6.50 @ 6.60. Coal inactive.

BELGIUM.

(Revue Industrielle.)
BRUSSELS, Aug. 24, 1881.—Iron.—The price of 13 francs is now readily paid for Merchant iron, consumers of which seem anxious to secure what they can upon this basis, expecting, as they do, that rolling mills will soon advance their figures in consequence of the abundance of orders dropping in all along. Rolling mills decline to sell on future delivery a long time ahead. Large plates are worth 16 francs. Sheet iron follows in the wake of the general upward movement; it now currently brings 17.50. Pig iron is stationary, but Foundry pig is, if anything, firmer. The turn which matters in the iron trade are taking is a most encouraging one; all works are profitably engaged; numerous orders are arriving all the time from France. A Belgium firm has just secured an order from there for iron turning bridges. We quote: Corners, 14.50; Bars, 13.50; Steel Rails, 17; Steel Hoops, 18; and ditto, 18.50. The fall campaign opens in this country at an earlier date this year, it would seem, than usual, in most branches, which is due, we presume, to the fact that stocks of most goods are very moderate, and that a good demand is in prospect in consequence of the rather better crops. Speculation we do not perceive any indication of; perhaps it is checked by the tightening money markets. Metals are steady; we quote: Copper, 155.50; Tin, 240 @ 242; Lead, 36.50, and spelter, 41.50. Coal is rising; at the last government adjustment an advance of 1 franc was established. Range, 7.50 @ 17.50; coke, 16.

FINEST SIX MONTHS.

	Importation.		Exportation.	
	1881.	1880.	1881.	1880.
Iron Ore	255,738	374,075	79,291	135,804
Pig Iron	101,974	125,521	7,642	7,511
Old Iron	8,073	8,755	16,214	27,660
Wire	8,731	8,236	3,849	3,481
Rails	274	346	17,684	14,816
Sheet Iron	206	187	16,628	14,112
Other Iron	4,040	3,736	71,314	87,359
Nails	184	319	4,576	5,935
Merchant Iron	2,406	1,821	10,801	10,425
Castings	4,363	4,013	9,817	5,780

	Coal.		Coke.	
	1881.	1880.	1881.	1880.
Prussia	166,027	174,329	8,739	7,915
Holland	70,805	101,784	1,000	1,000
England	140,374	214,688	1,000	1,000
France	58,783	65,459	4,576	3,337
Other countries	95	159	1,878	33
Total	432,883	456,599	15,124	11,204

	Coal.		Coke.	
	1880.	1881.	1880.	1881.
Prussia	55,126	45,894	1,644	1,495
Holland	2,035,600	1,844,432	316,391	322,702
England	77,235	77,235	77,235	77,235
Luxembourg	56,886	65,562	38	201
Other countries	2,137,612	1,955,498	395,708	472,113

GERMANY.

(Borrenhelle.)
HAMBURG, Aug. 16, 1881.—Iron.—Our Dortmund correspondent writes yesterday about the situation there: "There has been some chance since my last, inasmuch as pig iron has been looking up, while finished steel remained stationary. But this does not relate so much to foundry pig. The advance has been comparatively considerable, and the rolling mills would not be able to cover cost, were they to sell at their present rates while paying the now established prices of pig. Red iron is selling at 116 @ 120 marks, but last week quite a large lot was still obtained at 108. Both dealers and consumers still resist these prices, for they are as yet dissatisfied in the duration of the movement. Specie iron is wanted for building purposes and ship yards; it therefore brings rather better prices. Thick sheets have remained unsold at the comparatively better rates prevailing for some time past. The demand is active. Thin sheets attract more attention; a great deal thereof is taken to be galvanized. All galvanized ware is more and more extensively consumed; also for roofing thin galvanized sheets are now largely taken, and in mines they supersede wood for many purposes. Bridge builders and architects resort to galvanizing more and more; steam tubes and hollow ware are also galvanized more frequently than formerly. A couple of years ago there were only two or three galvanizing works in all Germany, now there are in the Rhenish provinces and Westphalia alone seven of them, 2000 motive and car works are likewise busier. The Harkord bridge building concern at Duisburg will henceforward manufacture cars more extensively, after furnishing parts thereof for Java some years since. Coal is favorably situated and doing well. Metals.—Our market has been quiet and without change. Lead is inactive; we quote English pig, 16 @ 16.50 marks per 50 kilos.; ditto Sheets, 16.75 @ 17.25; German pig, 15.20 @ 16.40, and Spanish, 17.20 @ 17.80. Copper is sustained; we quote Drontheim Roersas, in rosettes, 67 @ 68; Wallaroo, in blocks, 62; Electrolytic 3/4 A. in slabs, 74 @ 75, and English Refined Ingots, 66 @ 67. Spelter: a small jobbing trade is transacted at 15.75 @ 16 for Silesian, spot and to arrive. Tin.—The demand is moderate; we quote Banca, Australian and English Common, 96 @ 98, and ditto Refined, 98 @ 100.

(Cologne Gazette.)
DUSSELDORF, Aug. 15, 1881.—Iron.—Firmness in the pig iron market continues, with partially rising prices; Foundry pig is however unfavorably influenced by the weakness of Glasgow. All rolling mill produce remains in request at rising figures. In the Moselle and Sarre a favorable feeling continues to prevail, both in iron and coal, and the tendency goes to be firmer. On the lower Rhine and in Westphalia there has either been greater firmness or an advance outright. There is no lack of orders and most of the works require more time to deliver in. The coal trade is also satisfactory. The general situation in Upper Silesia has gone on improving both as regards iron and coal. We quote here per ton, Prime Spiegeleisen, 60 @ 70 marks; prime Gray Pig, 57 @ 58; Luxembourg Pig, 59.50; Charcoal Pig, 56 @ 57; Foundry Pig No. 1, 70; ditto No. 2, 64, and ditto No. 3, 57; English Pig No. 3, at Ruhrort, 58 @ 59; ditto Bessemer, at port of shipment, 58 @ 60; ditto German, 65 @ 65; Common Red Iron, 118 @ 120, and ditto line, 112 @ 145. Common Sheets, 185; Boiler ditto, 190 @ 195, and Thin Sheets, 173 @ 175. Rolled Wire for wire nails, 140 @ 142. Coal and Coke here are wanted and tending upward.

HOLLAND.

(Koch & Vlierboom.)
ROTTERDAM, Aug. 16, 1881.—Tin.—The market is quiet without change in prices. Billiton has sold on the spot at 55 guilders, and at this figure more may be had; at 1/4 less sales would probably not be refused. For Banca, 55.25 is the asking price; but no more than 55 is bid.

AUSTRIA.

(Austrian Trade Journal.)
VIENNA, Aug. 14, 1881.—Iron.—Not only is the better feeling here maintained, but it spreads throughout the country. Even pig iron begins to be favorably influenced, the demand becoming more active, but prices have not yet improved, stocks being still large still. Merchant iron, unchanged so far, consumption is most active, with every prospect of its being kept up. So far makers in Bohemia have not come to an understanding about raising prices still further, but the subject is extensively ventilated. The Styrian rolling mills have not even joined in putting up prices to the point ruling in Bohemia; pressure has been brought to bear on them to do so, but they have preferred not to follow the advice, but they will no doubt soon follow suit. Vienna, Pesth and Prague absorb a great deal of Structural iron just now. Sheet iron is in good position; producers thereof have agreed on raising figures between 50 kreutzers and 1 florin in Styria and Silesia. Some few ironmasters in Austria seem to apprehend that the present improvement will not last, and they are therefore averse to raising prices, but the remaining ones do not mind what they say; the demand being good in pretty much all branches, they are of opinion that higher prices are fully justified. They certainly have not put up figures in any extravagant manner yet. Makers of Steel Rails and the larger machine shops are all very busy and have been so for a long time past. We quote pig iron, 24 @ 25 per ton at the furnaces; Merchant iron, 20 @ 21; Sheets, 12 @ 13; and Pillars, 115 @ 118 at Vienna. Metals are steady; we quote: Copper, 70 @ 73; Tin, 114.50 @ 117; Lead, 17.50 @ 20; and Spelter, 17.50 @ 19.80.

American Manufacturers in England.

Vice Consul Doyle, of Manchester, says: In my first annual report from Manchester I made the following recommendations: A good article is the best possible agent that American manufacturers can send out, and with a high order of merit in their productions, combined with a low cost and wise methods in bringing them prominently into notice in English markets, there can be no reasonable doubt but that they will not only meet with popular favor, but in good time find large and profitable market here. In the light of larger experience I can bear witness to the importance of this advice. There is a vast market in Great Britain for various kinds of American manufactures, especially for such as are chiefly made of wood; and to develop this market it is only necessary to make a careful study of the tastes and requirements of the people, and then furnish what popular taste demands. As a rule it will, as a matter of course, take time and patience to secure the adoption of American manufactures; but when a demand is once created, it will largely increase when the article is accepted as suitable, reliable and satisfactory. Articles of inferior workmanship or material do great harm when sent to this market, for the reasons that competing home manufacturers not unnaturally seek an opportunity to point out their defects and enlarge upon their faults; and when it can be shown that they are deficient in strength or durability, a serious check is given to the introduction of really first-class productions. For this reason, even if no higher one is sought, the greatest care should be taken to fully test every article intended for a foreign market, and thus prevent fault-finding and prejudices on the part of foreign purchasers as far as possible. To show how it works practically, a leaf out of my own experience will be in order. Having ordered a couple of dozen cans of prepared soup from a noted Boston caterer, which gave great satisfaction, I was requested to order a small supply for a couple of friends, to test the various kinds advertised. I did so with pleasure, but was greatly put out afterward to learn that the soups turned out to be very inferior in quality; and, to use the expression of one of my friends, "they were shockingly weak and thin, evidently having been made where vegetables, chickens, mutton, &c., were scarce, and water very abundant." The opportunity which I tried to turn to account, in the interest of an American manufacturer of "soups," failed utterly, simply because the article furnished was not first-class, as it was recommended to be. An A. I. article would have surely led to a large demand for the same from this section, where now it will be a long time before "American soups" will be favorably thought of in the influential circle I live in mind.

This little incident forcibly illustrates the point I have endeavored to impress upon our manufacturers in preparing articles for this market. Cheapness is not so much an object in English markets as excellence. Really first-class productions are sure to be used, providing the style is popular and the quality good. Former prejudices are gradually yielding to the evidences of real merit in many lines of American manufactures, and now the term "American" has largely ceased to convey the idea of "shoddy" in articles sent over here for sale, as was formerly the case to a great extent. The superior quality, taste, and adaptability of many of our manufactures render them most attractive, and the demand for our products will increase in a sure ratio with their excellence and perfection in this splendid market in the future.

We have already given the details of the suit of the Missouri Furnace Company against

the Estate of John M. Cochran, for a breach of contract in a failure to supply coke. The Furnace Company contracted for nine cars of coke a day, at \$1.20 a ton. The "boom" came, and in February, 1880, the company was notified that Cochran would furnish no more coke at the contract price, when the company made a contract at \$4 a ton to cover the undelivered amount of the contract. Before this contract was filled, coke had fallen to \$1.30. The company claimed as damages the difference between the \$1.20 contract price and \$4, at which it bought. The court held that the contract was what is called a "favored contract," and that the damage is to be determined by the market price of coke at the different dates of delivery, and on this ruling damages were assessed at \$22,000. The company asked for a new trial on this ground mainly, and it has just been refused. This is an important decision in its bearing on contracts, and is contrary to the generally accepted belief as to the rights of a party in filling a contract when the party of whom he has bought fails to fill the same.

LABOR AND WAGES.

The Cincinnati Times Star says that the rolling mill owners have resolved to advertise for 350 non-union men to take the place of strikers. It also says that the iron and steel company at Portsmouth has a guide mill, puddle mill and a number of puddlers working, all non-union men, and expect to have their entire works in operation this week. This places the Portsmouth mill in the same category as that at Zanesville, which is also run with non-union men. The miners at Brady's Tunnel, Pa., on the Hemphill Extension Railroad, have gone back to work at the old figures of \$1.25 per day. Mr. Swearer, president of the Window Glass Workmen's Association, is now in the East, trying to settle the question of wages with Eastern workmen. There is no foundation for the rumor that there is to be another strike in the coke country soon.

The Swedish knibblers at the Roebing Rolling Mill are on strike against a Swedish boss. The Powell Iron and Nail Company, Chattanooga, have notified their nailers that they will adopt the Wheeling prices and rules for nailing on the 1st inst. This is a voluntary act on the part of the company to induce skilled workmen from the East to locate in the South. Chattanooga, Knoxville and Richmond nail manufacturers have hitherto been paying Eastern prices. This movement on the part of the Powell Iron and Nail Company, who will soon have 65 nail machines in operation, and rank among the leading nail works south of the Ohio River, will doubtless tend to make the price of nailing uniform West and South.

The scale of wages for work in the window glass houses of Pittsburgh that has just been signed, is stated to be the same as that of last year, except on sizes 10 x 12 and under, on which there is an advance of 10 per cent. The basis of the scale is 70 per cent. off window glass list. This scale went into effect on the 15th ult., and includes all skilled labor, blowers, gatherers and cutters. Two mills in the Cincinnati district are reported to have resumed work at the prices demanded by the men, one a very small mill at Cincinnati and the other the Terre Haute Iron and Nail Co., which makes only nails.

The Greenacres Iron and Nail Works Co. have notified their employees that on and after the first day of September they will pay Pittsburgh rates. The men have decided to reject the proposition of the company, and will stop work on that date if the notice is not withdrawn.

The Stove Order Bill, passed by the Pennsylvania legislature at its recent session, goes into effect to day (Sept. 1st). The new law provides that all persons, firms, companies, corporations or associations engaged in mining coal, ore or other minerals, or manufacturing iron, steel or any other product, shall settle with their employees at least once a month; and pay them in legal money, or by a cash order redeemable for its face value in lawful money, with interest, made payable to employee or bearer, and redeemable within a period of thirty days by the person or firm issuing it. Any person or firm, or agent of any person or firm engaged in such business, who shall issue for payment of labor any other paper or order shall be guilty of a misdemeanor punishable by a fine not exceeding \$100, which shall go to the common school fund of the district in which the crime shall have been committed. Another clause in the act provides for a sale of store goods at a reasonable profit, equal to that of merchants engaged in the same class of trade.

A Zanesville ironworker claims that the Zanesville branch of the Amalgamated Union is not properly conducted, and that the strike inaugurated by them was not a legal one or in accordance with the rules of the main organization. Further, that the non-union men of Zanesville are to-day working at Pittsburgh prices.

A Scranton, Pa., exchange says: Some of the collieries in Nanticoke are beginning work without the drivers' and miners' help. It is possible that when the boys get ready to go to work there may be no places for them. Such things have happened.

The Fishback Rolling Mill, in Schuylkill County, Pa., having experienced considerable difficulty in obtaining laborers, has secured a number of German immigrants. It is reported that a new labor organization has been formed in the mining region of Pennsylvania. The association is both industrial and political, is called the "Industrial Executive Club," and has been in existence only three months. In that time it has organized 25 branches in the mining districts of Schuylkill County, and averages over 25 men to each branch. The work is all secret, and the officers expect to have 5000 members before the next election.

According to reports from the Navy Department, the trials of the torpedo boat Alarm have been quite satisfactory in showing that a vessel of considerable size can be steered and propelled by a screw alone without a rudder, so that the hull itself becoming

the gun-carriage, a small vessel is capable of carrying the largest-sized gun and of aiming it with certainty and precision. The commander of the Alarm is of the opinion that the development of the Mallory screw will be of great benefit in any system of naval coast defense. The Alarm now appears to be in good condition.

Anti-Tarnish Paper.

A paper for protecting metals from tarnish or rust is prepared by saturating it with a compound of about equal parts of crude carbonic acid, light oil of coal tar and coal tar. The paper used is a thin tissue, which is passed through the coating and saturating material in connection with and supported by a sheet of stronger material, such as Manila paper or felt, or what is known to the trade as "hardware paper," to avoid the breaking, tearing or rending of the thin material. This produces at one and the same time or operation two products—one of light, thin material, and the other a heavier, thicker, stronger material. The former of these products is used as a wrapper for the article to be protected, while the latter or heavier product answers well as a lining for the boxes or packing cases in which the articles are to be packed or stored. The compound is placed in a tank, in which is located a steam coil, for the purpose of heating the compound to about 200° F. The two sheets of paper are wound upon separate rolls, from which they are brought together and passed over a friction roller and under an immersion roller in the tank, where they become thoroughly saturated. The sheets are then passed between two pressure rollers, by which means any excess of the saturating material is removed from the fabric and finds its way back into the tank. There are two sets of heated rollers, of any desired or convenient size, heated by steam. Any desired number of sets or pairs of these heating rolls may be used. There are also two hollow rectangular boxes or steam chests, between which and in contact therewith and between the rollers the fabric is passed. The hollow rollers and other steam-heated surfaces are kept at a heat of about 200° F., and the paper or other fabric emerges therefrom in a dry and clean state. After passing through the heating and drying surfaces the webs of paper are separated, each being wound on a roll. The various rolls or drums, together with the heating rolls and pressure rollers, may be connected together by suitable gearing, or by bands and pulleys for joint action. By using the heavier fabric as a carrying medium for the lighter or tissue fabric, the difficulty of frequent breakage of the tissue fabric is overcome and the cost of production is reduced. An endless belt of suitable material may be used as a carrying medium when caused to pass through the saturating material and through and between the pressure rollers and heating surfaces. The tissue, or light, thin fabric produced by this process is designed for use as a wrapper for gold, silver-plated ware, nickel and brass goods, metal buttons, and, in fact, all bright metals or metals capable of injury from rust or tarnish. The coarser or heavier material is well adapted for the lining of the boxes in which the articles are to be packed for shipment or for storage, and is also useful and applicable for various other purposes.

Gathering Rubber in Colombia.

Consul Smith, of Cartagena, has sent to the State Department an interesting sketch of the manner in which the natives of the South American States of Colombia extract milk from the rubber trees and prepare it for the market. Before entering the woods, the rubber hunters provide themselves with guns, ammunition, flour, salt and tobacco. The flour is made from plantains, is generally mixed with corn meal and will keep for months. When the locality for a camp is decided upon, a roof of palm is speedily made, and the camp being established, every man starts out with a gun and machete, each in a different direction, in search of rubber and game. When a rubber tree is found, a space is cleared from the roots, by cutting away vines, underbrush, &c., and the funder moves on in search of other trees, not returning to camp until night. Custom decides that the rubber tree belongs to the man who has cut around it.

When all the trees in the vicinity of the camp have been discovered the work of gathering the rubber begins. Before tapping the tree a hole is dug in the ground close to it, unless another party is camped near, in which case the hole is dug near the camp of the owner of the tree. The bark of the tree is first cut with a machete, as high as a man can reach, the cuts being in the form of the letter V. The milk is caught as it exudes, and is deposited in the holes previously dug in the ground. When the milk ceases to flow from the cuts the tree is chopped down and its trunk raised from the ground by means of an improvised trestle. After placing large leaves on the ground under the tree to catch the sap, gashes are cut throughout the entire length of it, and the milk that exudes from the gash is carefully collected and deposited in the vat. When it first exudes the sap is of the whiteness and consistency of cream, but it turns black upon exposure to the air and light if not properly watched. The quantity of milk put into one hole depends on the size of the trees, their distance from each other, and the strength of the man who is to carry the rubber to the river. When the hole is filled with rubber it is coagulated by adding the root of mevacan, hard soap, &c. These substances cause the milk to coagulate so rapidly as to prevent the escape of the water, which is always present in the fresh sap, and as the rubber and water will not mix, a piece of rubber coagulated in this way is

always filled by small cells, which reduces its commercial value. When coagulated the rubber is strapped on the backs of the hunters by bark thongs, carried by them to the banks of the river and floated to market in canoes or on rafts.

The annual destruction of rubber trees in Colombia is very great, and as the people have not turned their attention to planting trees to supply the wastage, there is some apprehension that this industry will be seriously crippled before many years unless the Colombian government enforces its regulations against the destruction of forest trees, and compels hunters for rubber to tap without destroying the trees by cutting them down. Consul Smith thinks there is a good chance for profitable investment in this direction. He says there are places on the Sinu River where rubber trees will grow from 8 to 10 inches in diameter in three or four years from the seed. The trees require little attention, and begin to give returns sooner than almost any other. The trees that yield the greatest amount of rubber flourish along the banks of the Sinu and Asiatto rivers.

The reports of the Bureau of Statistics show that the value of crude india rubber annually imported into the United States is about \$10,000,000.

Messrs. Maxwell & Silliman, of Allegheny City, have invented and applied practically a method of setting steam boilers which consists in passing the head of the boiler through the fire-front and resting it upon a saddle, mounted upon a pillar provided with anti-friction rollers. Boilers, as built at present, are attached to the front and to the masonry in such manner that there is no freedom to expand and contract under the variations of temperature. The consequence is, that the boiler pushes and drags on the fire-front, warping and straining it, or breaking it; the boiler sheets become warped, and breaks are apt to show at the seams, the anchor bolts holding the front to the masonry are wrenched, and the masonry becomes loose and unsafe. To avoid these dangers, the opening in the fire-front is made greater in diameter than the boiler, so that the latter can play freely back and forth. A pillar or ornamental column stands vertically under the boiler head, in front of or behind the furnace-front to which it is bolted. The top of pillar or column is scored out and contains several rollers, set transversely to the length of the boiler. On the rollers rests a saddle, having its top curved to fit the boiler and its bottom flanged to guide itself upon the column. The saddle occupies such a position that, when resting upon it, the boiler is not in contact with the front at any point. Set in this manner, the variations of length in the boiler, under the different conditions of temperature, will not have any straining effect whatever upon the front of the furnace, or, through it, upon the anchor-bolts in the masonry—because, resting upon the saddle, the boiler will expand and contract with perfect freedom, and no warping of its sheets, and consequent breakage, will occur.

George H. Clark, who died in Hartford, Conn., recently, at the age of 72 years, was one of the oldest merchants of that city. He was the senior member of the firm of Clark & Co., engaged in the iron business. In early life he held for a time a position in the iron firm of Boorman, Johnston & Co. He was afterward associated with his father, Ezra Clark, and his brother, Ezra Clark, Jr., in the same business.

The preliminary hearing of the alleged Molly Maguire murderers was concluded at Uniontown on Saturday. The Court decided to remand Kane and discharge Donahoe; the others were held for trial in the following amounts of bail: McFarland and Pat Dolan in \$5000 each, Collins in \$3000, Flood, Mike Dolan and Regan in \$500. Both of the Dolans obtained bail; some of the others will probably not be so fortunate.

According to a report published in the *Annales des Ponts et Chaussées*, there are now 14,750 miles of railroad in France.

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Picture Frame Vise
The Greatest Invention
of the Age.
It has no catches or
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Holds both pieces of
molding at once, and is
the only perfect Picture
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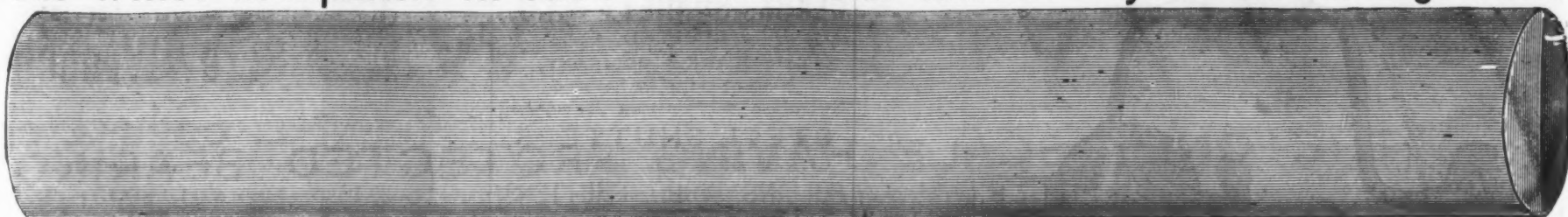


LIST OF BRANDS.

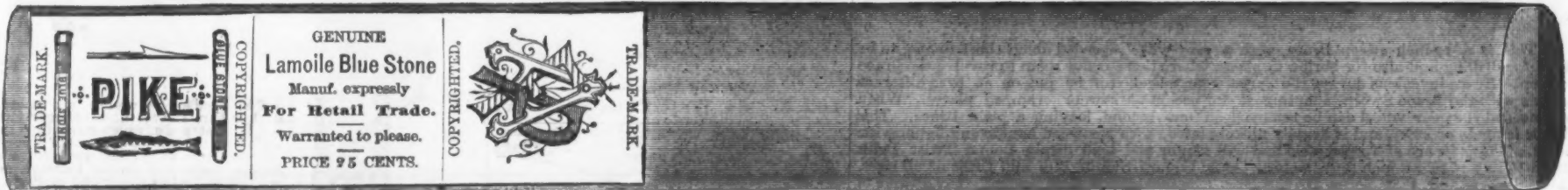
Old,
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(Red End),
Premium,
Union,
White Mountain,
Letoile,
Diamond Grit,
Fisherman (Rough),
Boss Hacker (Oval),
Lamoille,
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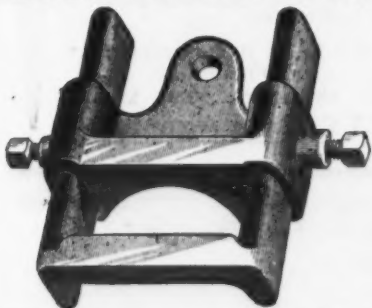
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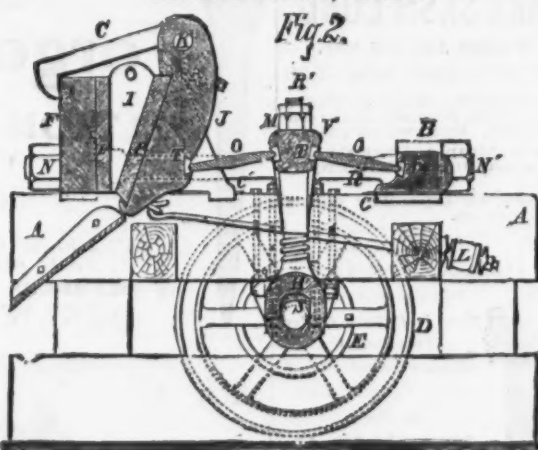
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Guaranteed to weld perfectly and capable of being drawn under a hammer. Address,
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BLAKE'S
CHALLENGE ROCK BREAKER.

Patented Nov. 18, 1879.



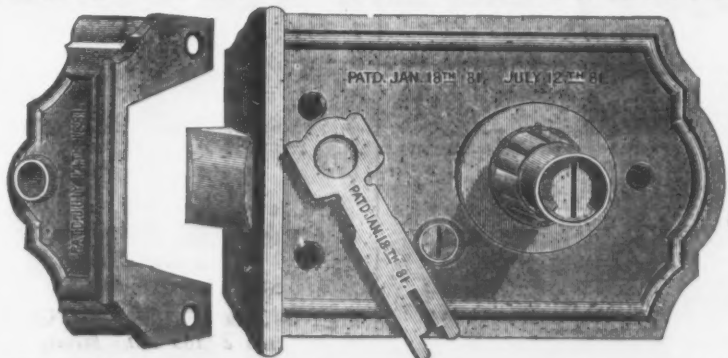
The most economical and reliable Crusher in use. Superior in all respects to our old style Blake Crushers, and rapidly superseding them and all imitations. For railway ballast, Macadam road making, and crushing of ores of all kinds it has no competitor.

This machine dispenses with cast iron frame and pitman of our old forms. All strains are on wrought iron or steel.

Awarded medals of superiority by judges of American Institute Fair, New York City, 1879 and 1880, where it was exhibited in competition with our old forms of Crusher. Address,

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After having used your "Variable Blast Tuyere Iron" 3 months, I pronounce it perfect in every respect, and it actually saves from 25 to 50 per cent. of the coal.
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Earlville, Ill.

FIGURE 1.



Figure 1 represents the interior of the Tuyere, showing the rotating air tubes through which four different sized currents of air may be passed, thereby making any sized fire from 2 to 18 inches in diameter; for instance, if a large fire is being used and the next job should be a nail rod, we do not move or burn the large bed of coal, but turn the small tube up and concentrate the heat to the point desired.

FIGURE 2.



Figure 2 represents the Water Tuyere complete, the constant flow of water keeps the Tuyere cool and prevents cinders or clinkers from forming in the fire. To prevent the water from freezing in the pipes, the barrel is supplied with a faucet that empties the pipes, but not the barrel.
All the dirt from the fire sifts through the perforated fire cap into the dirt bag, from which it is blown by the blast when the ball valve is raised for that purpose.
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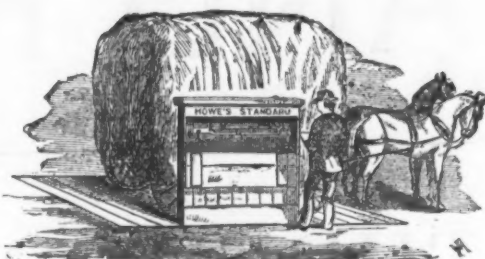
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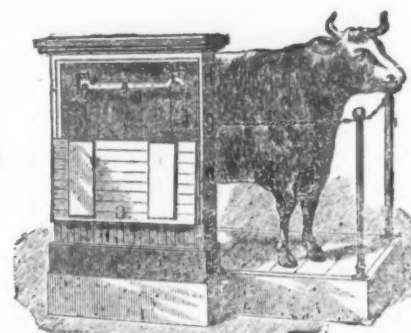
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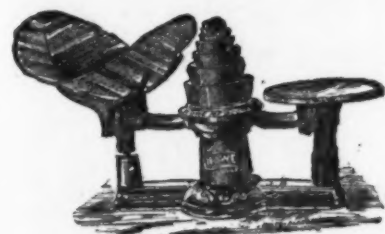
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We are yours very truly,
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Water Driven to any Height and Distance by Compressed Air.

Country Houses Supplied Cheaply and Certainly for Bath Rooms, Water Closets, Hot and Cold Water Faucets, &c.

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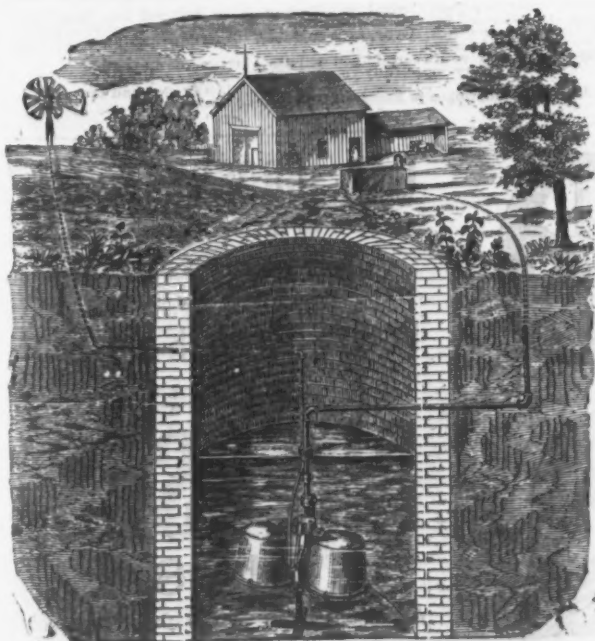
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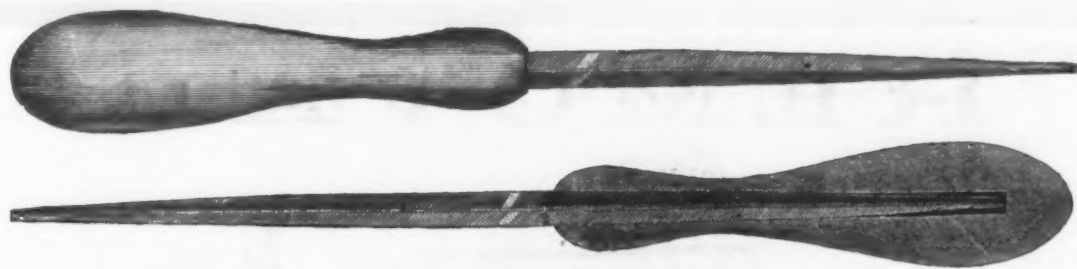


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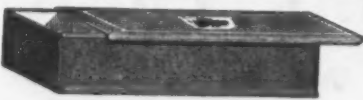
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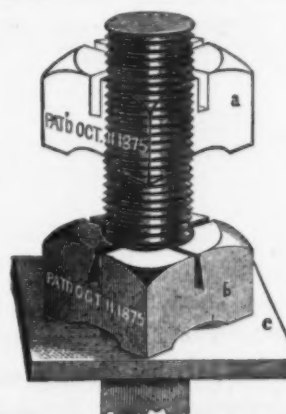
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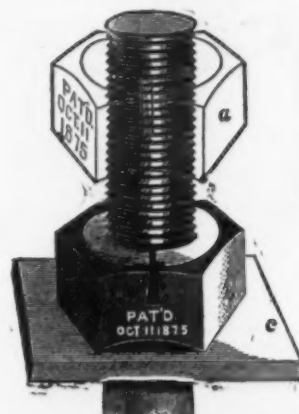
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b, Atwood Nut turned to bearing c, partially closing the slots, and grasping the bolt.



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ROCK & ORE BREAKERS,
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Manufacturers of all kinds of

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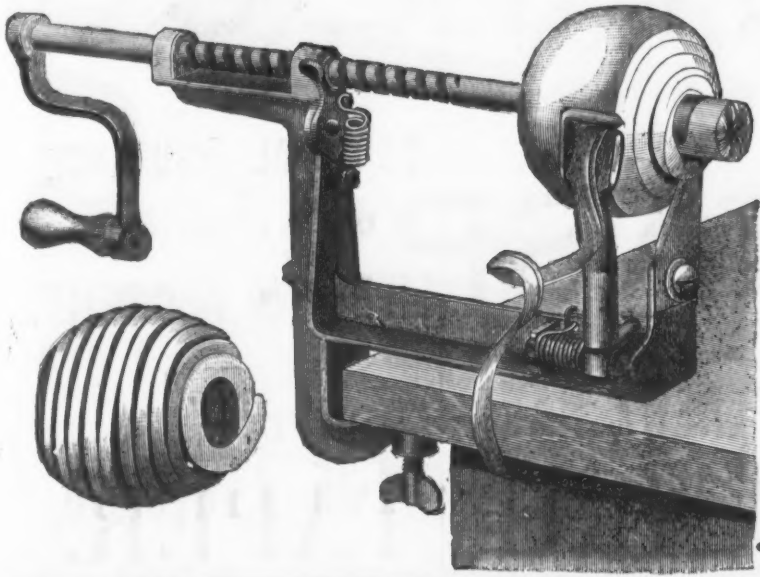
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— This Parer, introduced last year, has completely revolutionized the Parer business of the world, and as our patents are broad and reliable, has practically given it to us. As in the past, we shall promptly prosecute all persons infringing upon our claims. We are also sole manufacturers of the Bay State Parer, and all others made under Bay State Patents, and are fully prepared to furnish Parers for large canning and evaporating establishments. Also manufacturers of Turn Table and Lightning Apple Parers, White Mountain Potato Parers, &c.

GOODELL CO.'S BUTCHER KNIVES.



We now make five distinct styles of Butcher Knives, at corresponding prices. Every blade of every style is warranted in cutting quality equal to the best on earth, and everybody who has seen them knows that the handles are superior, both in style and strength, to all others.

Also, superior hot-water proof Table Cutlery and Shoe Knives.

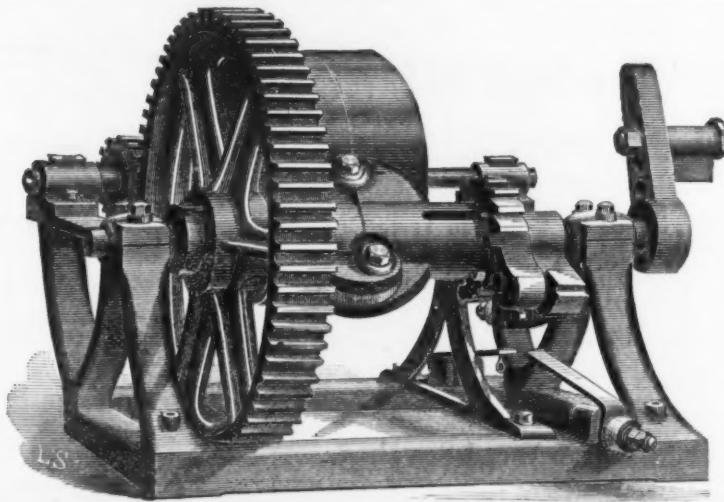
GOODELL COMPANY, Antrim, N. H., U. S. A.

REMOVAL.

NEW HAVEN, CONN., July 15, 1881.
DEAR SIR: We have removed our works to our new factory, corner Lloyd and River Streets, Grapevine Point, where we have increased facilities, not only for the production of the

Peck Patent Drop Press,

but also for the manufacture of Drop Dies, Drop and Machine Forgings and Special Machinery.



Our Forging Department is fitted out with the latest improved tools.

We are prepared to quote prices for the manufacture, by contract, of specialties in the Drop Forging line. We have also facilities for furnishing heavy Machine Forgings, such as Cranks, Connection Rods, Drop Die Blocks, Heavy Dies, &c.

Thanking you for past favors, and hoping to receive a continuance of same, we remain, yours respectfully,
BEECHER & PECK.

PROVIDENCE STEAM TRAP COMPANY, Manufacturers of Newton's Patent Steam Trap, Compensating Valve, Oscillating Furnace Bars, and Furnace Economisers.

R. NEWTON, C. E. M. E., Supt.

JOHN TURNER, Treas.

JOHN SHORE, Secy.

To Manufacturers, Bleachers, Dyers, and all Users of Steam: We wish to call your special attention to our PATENT STEAM TRAP, acknowledged by practical engineers and manufacturers to be the best, simplest, most effective and durable Trap ever brought before the public. The simplicity of this Trap consists of doing away with all expansions and contractions, no glands or stuffing boxes, or bolts of any description required: no compound cylinders and no copper rods. The cover can be removed at any time to see it work; and if required the discharged water can be elevated from two to thirty feet, so that it can be used for other purposes. They will last from thirty to forty years. As regards frost and snow it makes no difference, as we have had and still have one working in the open air at Washington Mills, Lawrence, Mass., and it has done its work well, never having had any trouble with it, and bids defiance to all weather. That they have been thoroughly tested can be seen by the testimonials given below, of the few that have come to hand:

TESTIMONIALS.

Washington Mills, Lawrence, Mass., November 15, 1880.
Mr. R. Newton.—DEAR SIR: The Steam Trap we bought of you last August works admirably. Please send us another as soon as possible. Yours truly,
JAMES B. SINGER, Mech. Supt.

Clyde Bleachery and Print Works, River Point, R. I., January 17, 1881.
Mr. R. Newton.—DEAR SIR: The Steam Trap we had of you is in successful and very satisfactory operation. Its simplicity in construction and undoubted durability will commend it to all who are in want of a superior Steam Trap. We shall order more when in need of any. Yours truly,
S. H. GREEN & SONS.

A. & W. Sprague Mfg. Co., Cranston Print Works, R. I., Jan. 15, 1880.
Mr. Robert Newton.—DEAR SIR: The Steam Traps we bought of you work first-class and give every satisfaction, and appear to be very durable. We think them the best Steam Trap that we have ever had. When in want of more will write you. I remain, yours, truly,
THOMAS BRISTOW, Supt. Cranston Print Works.

Office of Washington Mills, Boston, December 24, 1880.
Providence Steam Trap Co.—GENTLEMEN: Please forward to Washington Mills as soon as possible six (6) 1/2-inch Traps and send bill to me. Yours truly,
HENRY F. COE, Treas.

Kendall Manufacturing Co., Providence, R. I., Feb. 1, 1881.
Providence Steam Trap Co.—GENTLEMEN: We have used one of your Steam Traps for some time and would say that we find it gives perfect satisfaction. Yours truly,
NICHOLAS SHELTON, Treas.

Providence, R. I., December 18, 1880.
Mr. Newton.—DEAR SIR: We have your Steam Trap working satisfactorily, and can conscientiously recommend it to all. Yours, very truly,
B. COLLINGHAM, Supt. Atlantic Mills.

ROBERT NEWTON, C. E. M. E., Inventor and Patentee, Providence, R. I.

PATENT OSCILLATING FIRE BARS.

We wish also to call your attention to R. Newton's PATENT OSCILLATING FIRE BARS, which for durability, economy and application are acknowledged by all practical engineers that have seen them up to the present time to be the best ever brought before the public. This invention the patentee has labored at more or less since 1851. These bars have long been wanted, and their use will at once prove their efficacy as an economiser of fuel and labor. These bars can consume from four to twenty-six pounds of coal per square foot of grate, per hour, and not warp; and the apertures can be kept clean so that they can get a regular supply of oxygen, which is the life-giving power of calorific. They can be applied to all kinds of boiler surfaces (except vertical), and can be fitted to the furnaces in about five hours. Testimonials can be forwarded, if required, to show that they are now in use in some of the largest firms in the world.

SOME OF THE ADVANTAGES: These bars allow the use of inferior coal; evaporating power is greatly increased. This is a great boon where boiler power and space is limited. This advantage cannot be over-estimated in the case of marine boilers. The oscillating of the fire bars both cuts and lifts the slug, and clears the apertures at the same time. The bars give four motions in one oscillation, and cannot get out of order. They are also free of expansion and contraction, both longitudinal and transversal, and however careless the stoker may be he cannot leave them so as to take any harm. They are so cast, and of such metal, that they are the most durable bar ever brought into use. All now in use are very much approved. They are very simple and cannot get out of order. Their cost is so reasonable that they come within the reach of all. The company are now granting licenses to several firms to make and apply them, and are open to arrange with other parties. N. B.—The company furnish first sets of models.

Agents wanted for different locations.

All communications should be addressed to PROVIDENCE STEAM TRAP CO., P. O. Box 1213, Providence, R. I.

THE OHIO GRINDSTONE CO. MANUFACTURERS OF

GRINDSTONES

SUITABLE FOR ALL PURPOSES AND IN ANY QUANTITY.

Cleveland, Ohio.

No. 00. No. 10. No. 2.

VERMONT SNATH CO.,
MANUFACTURERS OF THE
No. 00 and 000 Patent Swing Socket Snaths.
SPRINGFIELD, VERMONT.

Represented in New York by LAMSON & GOODNOW MFG. CO.

CLOTHES WRINGERS.

"EUREKA" WRINGER.
BOSTON.

T. J. ALEXANDER, Manager,
BOSTON, MASS.

THE DEXTER CARRIAGE SPRING

Combines Strength, Durability, Beauty, Light and Easy.

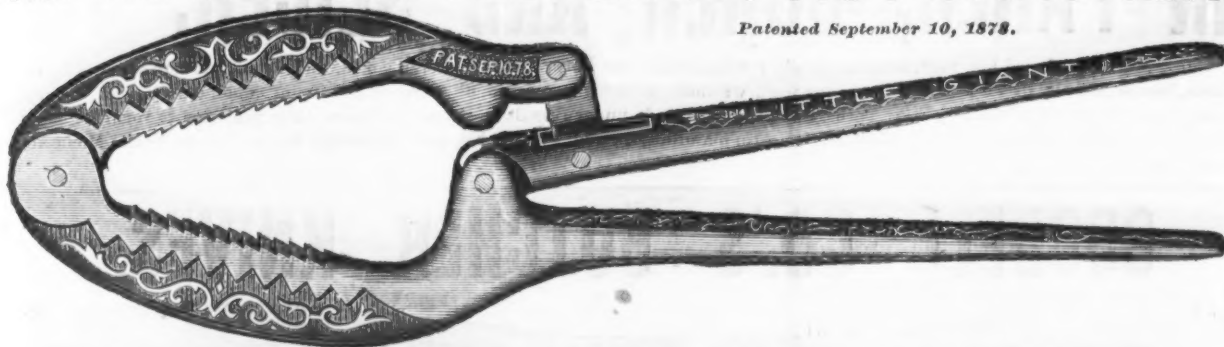
It is Graceful, Noiseless.

The DEXTER SPRING is the most perfect Carriage Spring ever invented. Wherever it is known it is rapidly superseding all others for pleasure vehicles. It is especially recommended for use on the rough roads of new countries, as its peculiar construction relieves the strain on the vehicle and shock to the passenger, while the high grade of material used reduces the probability of breakage to a minimum.

For circulars, prices, &c., address
DEXTER SPRING CO., Hulton, near Pittsburgh, Pa., U. S. A.

IMPROVED LITTLE GIANT NUT CRACKER.

Patented September 10, 1878.

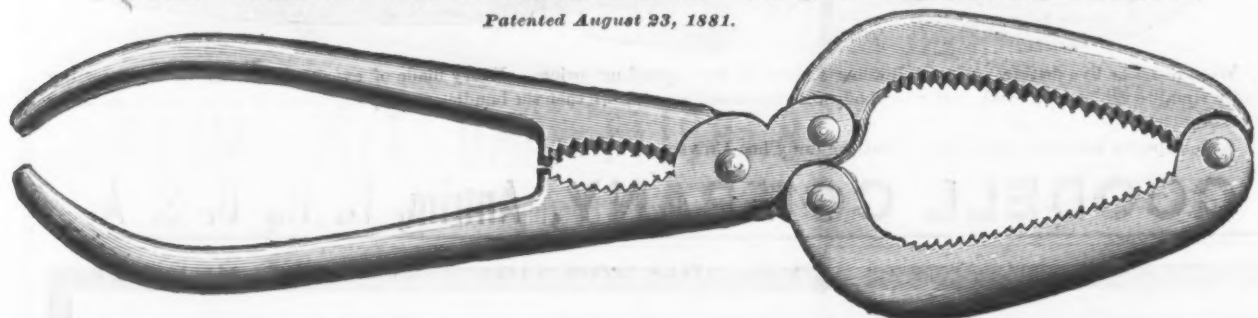


They will Crack Hickory
Nuts with Ease.

With these Nut Crackers a child three years old can crack hickory nuts as well as a grown person, and no cracked fingers as with a hammer. Auxiliary Smaller Jaws for small nuts.

THE NEW HERCULES NUT CRACKER.

Patented August 23, 1881.



Manufactured only by

THE RENZ HARD-
WARE CO.,

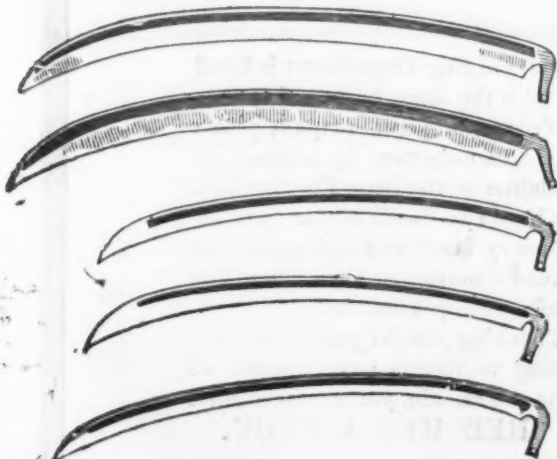
BRIDGEPORT, CONN., U. S. A.

Warerooms,

32-36 Park Row, New York City.

BEARDSLEY SCYTHE COMPANY, West Winsted, Conn.

Manufacturers of the well-known brands of:



German Steel, Cast Steel and Silver
Steel Grass Scythes.

ALSO THE

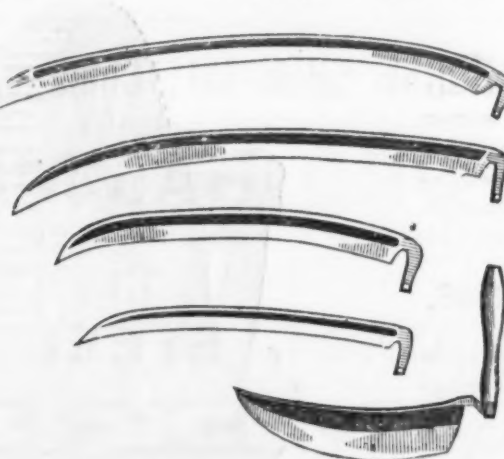
Clipper, Emperor, Beardsley's Golden Trimmer,
Conqueror, Dutchman, Waldron, &c.

ALSO

Silver Steel, Clipper & Harvest Victor Grain Scythes,
Common Pattern & Spear Point Hay Knives.

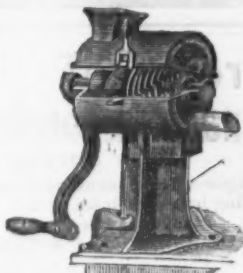
ALSO

Corn Knives, Bush & Weed Scythes.



Kieser's Gem. Kieser's No. 55

Double
Shearing
Cut.
Solid
Cast
Steel
Blades.



Patented Sept. 14, 1880.

Family Meat Cutters are the best made.

Every family should have one. Will thoroughly
cut Raw or Cooked Beef or Pork, Vegetables, Co-
conuts, Pine Apples, &c. Will cut forty pounds
sausage meat an hour.

Every Druggist should have one for cutting
Roots, Vanilla Beans, &c.

Easily worked. Easily cleaned. Will not get
out of order. Ask your dealer for them.

Send a postal for Circular with testimonials.
Will send one as sample by express upon receipt
of \$2.00.



Are Made on the Same Principle as
the Gem Meat Cutters,

But with capacity to cut 100 pounds
Pork an hour.

Will send one as sample on receipt of \$3.00.

Our No. 1 Butcher, for hand or power, will
cut 300 pounds an hour.

Our No. A Butcher for power, will cut 1000
pounds an hour.

We warrant our Cutters to do the work more
thoroughly than any other machine made.

Also Sole Manufacturers of

KIMBALL'S PATENT SHOVELS & SPADES,
BOSS PATENT MOLASSES GATES,
LOCKWOOD'S PATENT HOES.

KIMBALL SHOVEL CO.,

Office, No. 67 German St., Baltimore, Md.

Established
1855.KEYSTONE WORKS. Centennial Award
1876.

GEORGE GRIFFITHS,

MANUFACTURER OF

Shovels,
Spades,
Scoops,
Coal Hods, &c.,

Nos. 511, 513 and 515 Locust St.,

PHILADELPHIA, PA., U. S. A.

Send for Price List.



TURNED
MACHINE SCREWS.
One sixteenth to five-eighths diameter.
Head and points to sample.
IRON, STEEL AND BRASS.

JOHN FELLOWS,

(Successor to LYON & FELLOWS.) Factory and Office, 14 Durham Place, Williamsburgh, N. Y.

CLARK'S

IMPROVED SCREW DRIVER,
And Case containing Handle and Set of
SCREW DRIVERS.

The Blades are made of JESSOP'S CAST
STEEL, with milled Points and Shanks, making
them interchangeable, and are warranted.

This Driver has four Blades from 1/4 Inch to
1 Inch in width.

ALSO MANUFACTURER OF WILLIAM A. CLARK'S
Expansive Bit,
with two Cutters, boring from 7-8 to 3 inches.

R. H. BROWN & CO.,

SUCCESSORS TO

WM. A. and F. E. CLARK,
WESTVILLE, Conn.

Stanley Rule & Level Co.,

MANUFACTURERS OF

Improved
Carpenters'
Tools.



FACTORIES

New Britain, Conn.

WAREHOUSES,

29 Chambers St.,
New York.

Manufacturers of Malley's Patent Adjustable Planes.
General Agents for the sale of Leonard Bailey & Co.'s "Victor Planes."
Manufacturers of "DeLancey" Patent Adjustable Planes.



PERSONAL INSURANCE

IN ALL BEST FORMS,

LIFE AND ACCIDENT.

'The Travelers,'

HARTFORD, CONN.

Cash Capital, - - \$600,000
Cash Assets, over - - 5,800,000
Surplus to Policy Holders 1,435,000

LIFE AND ENDOWMENT POLICIES

Of all safe and well-approved forms. Cash
Insurance at low Cash Rates. Plain con-
tract, ample security, prompt payment, and
equitable surrender value.

Life Policies in Force, over 12,000
Claims Paid in Life Dep't, \$1,750,000

General Accident Policies

By the Year or Month, insuring against
death by accident, or Weekly Indemnity in
case of wholly disabling injury. Cost but
little money, and written by Agents at short
notice.

No. Accident Policies issued, 690,000
No. Accident Claims paid, 62,000
Amt. Accident Claims paid, \$4,375,000

LIFE AND ACCIDENT COMBINED,

Giving complete protection for life and limb
under one contract. Costs about the same
as ordinary mutual rate for Life Policy
alone.

REGISTERED ACCIDENT TICKETS,

Insuring \$3000 against fatal accident, or
\$15 a week for total disability, at 25 Cts.
a day, or \$4.50 for 30 days. Sold at
Railway Stations and at Agencies generally.
Much used by travelers, but not limited to
accidents of travel.

Money, Time, Life are lost by
Accidents.

MORAL: Insure in The Travelers.

JAMES G. BATTERSON, Pres't.

Rodney Dennis, Sec'y.

John E. Morris, Asst. Sec'y.

New York City Office,

TRIBUNE BUILDING,

R. M. JOHNSON, Manager.

AGENTS NEARLY EVERYWHERE.

Apply to any Agent,

OR TO THE

Home Office, HARTFORD.

DUNNING FINISHED STEEL HORSE SHOES.

The most popular Horse Shoe in the world. Will outwear three Iron Shoes.

Dunning Steel Finished Horse Shoes may be ordered in any quantity, packed, assorted sizes to suit, from the following hardware houses:

SIMMONS HARDWARE CO., St. Louis.

HIBBARD, SPENCER & CO., Chicago.

S. D. KIMBARK, Chicago.

JONES & LAUGHLIN, Chicago.

KELLY, MAUS & CO., Chicago.

PARKHURST & WILKINSON, Chicago.

W. B. BELKNAP & CO., Louisville.

NICHOLS & DEAN, St. Paul.

H. KAHLO & CO., Toledo.

W. J. HOLLIDAY & CO., Indianapolis.

COOMBS & CO., Fort Wayne.

GEORGE TRITCH, Denver.

STEVENS & GARRIGUES, Leavenworth.

B. D. WEST & ROSE,

97 Liberty St., New York.

LOCKE, HALE & CO.,

22 Tyler St., San Francisco

Send for sample keg, assorted sizes. Full descriptive catalogues sent on application. Manufactured exclusively by

THE CHICAGO STEEL HORSE SHOE CO., Chicago, Ills., U. S. A.
FACTORY AT PULLMAN (NEAR CHICAGO), ILLS.

THE HARTFORD HAMMER CO.,

Successor to THE HAMMOND HAMMER CO.,

MANUFACTURERS OF

SOLID CAST STEEL HAMMERS,

Adze Eye and Bell Faced Nail Hammers, Machinists' and Blacksmiths' Hammers.

The attention of the trade is called to this line of goods as superior in style, quality and workmanship to any in market. Lists furnished on application.

For Sale by C. E. JENNINGS & CO., 96 Chambers St., New York, and the Trade generally.

CHAMPION ONE-MAN SAW



WITH PATENT ADJUSTABLE ATTACHMENT. The only Saw that can be adjusted for either a One-Man or a Two-Man Saw. We make the following lengths, 3 1/2, 4, 4 1/2, 5 feet. Send for sample.

WHEELER, MADDEN & CLEMSON MFG. CO., Middletown, N. Y.

HARVEY W. PEACE, VULCAN SAW WORKS

BROOKLYN, E. D., N. Y.,

Manufacturer of First Quality

HAND, PANEL, AND RIP SAWS,

AND KINDRED GOODS;

Also, MILL, CROSS-CUT AND CIRCULAR SAWS.

BAND SAWS A SPECIALTY.



ESTABLISHED 1836.
SHELTON & CO.,

Manufacturers of every variety of

TACKS & SMALL NAILS.

Carriage, Tire, Machine, Plow, Stove and Spring Bolts, Coach and Bed Screws, &c.

BIRMINGHAM, CONN.

Flagler, Forsyth & Bradley, Agents, 298 Broadway, New York.

Armstrong's Improved Adjustable Stock and Dies FOR PIPE AND BOLTS.



Tapped to the U. S. and Whitworth Standard Gauges. Adjustable to all variations in the size of fittings. Can be resharpened without drawing the temper by simply grinding them. Possessing practical advantages appreciated by all mechanics. Circular and Price List sent free on application.

Manufactured by F. ARMSTRONG, 30 Sterling St., Bridgeport Conn.

Are forged from a solid bar of steel. Afford a firm level bearing, thereby securing to the horse the most natural position for comfort and speed. Is a self-cleaning shoe, and will not "ball up." Equally good for summer or winter use. Will prevent horses from "calking" or growing corns. Can be resharpened as readily as an iron shoe.

OPINIONS.

I do not hesitate to give it as my opinion that it combines more excellences than any I have before seen. It provides a solid base under all circumstances, for the horse while standing or traveling; has no rocking motion while the animal is turning, and possesses eleven calks to protect him from falling. I have never seen the inventor of this improvement, but I desire, in the interest of the noblest animal living, to thank him for the good his shoe is likely to bring him.

HENRY BERGH,
President the American Society for Prevention of Cruelty to Animals, New York.

OFFICE OF NORTH CHICAGO CITY R. R. CO.,
CHICAGO, Feb. 16, 1881.
CHICAGO STEEL HORSE SHOE CO.—Gents: We are using your "Dunning Steel Horse Shoe" on our car horses, and find they last us from three to four months before being worn out. We drive our horses about 16 miles a day—half over cobble stones and balance pavement. We consider them the best shoe made.
M. W. SQUIRES, Supt.

Nos. 56 to 68 W. VAN BUREN ST.,
CHICAGO, Feb. 26, 1881.
CHICAGO STEEL HORSE SHOE CO.—Gents: I have used the Dunning Steel Shoe on my horses with great satisfaction. I regard it as the most practical and valuable improvement yet made in Horse Shoes. I am sure they will commend themselves to owners and shoers.
Yours truly,
A. W. KINGSLAND,
Secretary Northwestern Horse Nail Co.

UNITED STATES SMELTING WORKS,

MANUFACTURERS OF



BABBITT AND TYPE METALS,

Brass Castings and Solders of all Kinds.

PIC AND BAR TIN.

PIC AND BAR LEAD.

Pig Brass and Copper, Spelter, Antimony, &c.

1615 & 1617 Spring Garden Street,

PHILADELPHIA.

GEORGE HUNT,

M. S. STOKES.

Gentlemen.—This cut illustrates our

CAST IRON

Furnace Lamps

which are superceding entirely the Tin Lamps wherever introduced, in consequence of their durability. They are now extensively used in the Iron Districts of Ohio and some in Pennsylvania. We call your attention to and solicit your order for them, confidently asserting that they are an A No. 1 article in every respect.



Sample sent if desired.
PRICE, \$12 PER DOZEN.

Taylor & Boggis,
CLEVELAND, O.

GREENFIELD TOOL CO.,

(GREENFIELD CUTLERY CO.)

Greenfield, Mass., U. S. A.,

MANUFACTURERS OF



Fine Table Cutlery.

Solid Handled, Bone, Ivory, Rubber and Wood, Solid Steel Silver Plated.



PATENT CONCAVE FORGED OX SHOES.

Also, FLAT SHOES with

TWO CALKS at same price.

ALSO,

PLANES, PLANE IRONS, &c.

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MANUFACTURERS OF

HARDWARE SPECIALTIES.

Office and Factory: Lehigh Ave. and American St., Philadelphia. Branch House: No. 124 Chambers St., New York.

SPECIALTIES: Fluting Machines, Hand Fluters, Plaiting Machines, Christmas Tree Holders, Bickford Portable Pump, Mrs. Potts' Patent Cold-Handle "Crown" Irons, Ice Cream Freezers and Cake Mixing Machines.



M. L. EDWARDS,

SALEM, OHIO,

Maker of

MEAT CHOPPERS,

Lard Presses,

Sausage Stuffers,

Blacksmiths' Drills (three kinds), Improved Blacksmiths' Tapers, Hub Boring Machines, Hollow Augers, Lightning Fodder Cutters.

John Carver,

MANUFACTURER OF

CAULKING IRONS,

Cotton, Freight and Hay Hooks,

No. 44 North Third Street,

Near First, BROOKLYN, E. D.



HAMMOND'S Window Springs

Lock and support upper and lower sashes—all sizes. Are very convenient, simple and durable. Sample to the Trade free.

W. S. HAMMOND,

Lowell, Mass., U. S. A.

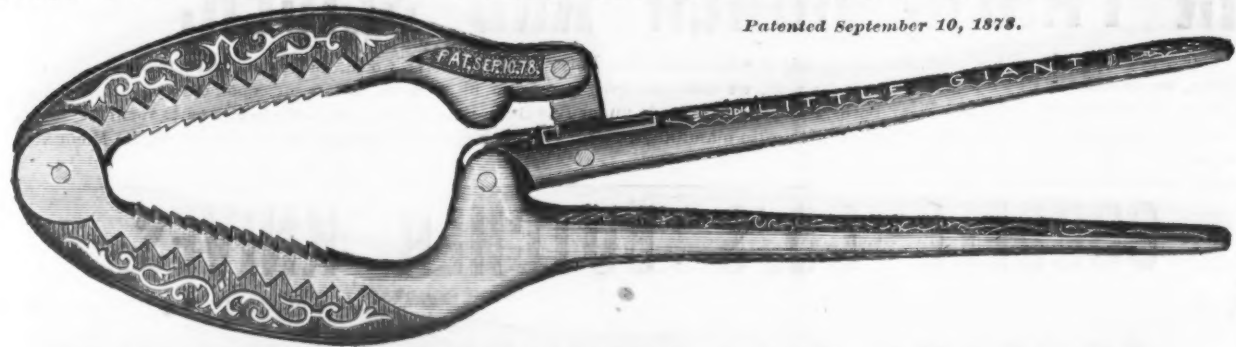
Circulars give full instructions.



THE BEST TAPPING MACHINE
LATEST IMPROVEMENTS
PURDY MACHINE CO.
23 CENTER ST. CLEVELAND, O.

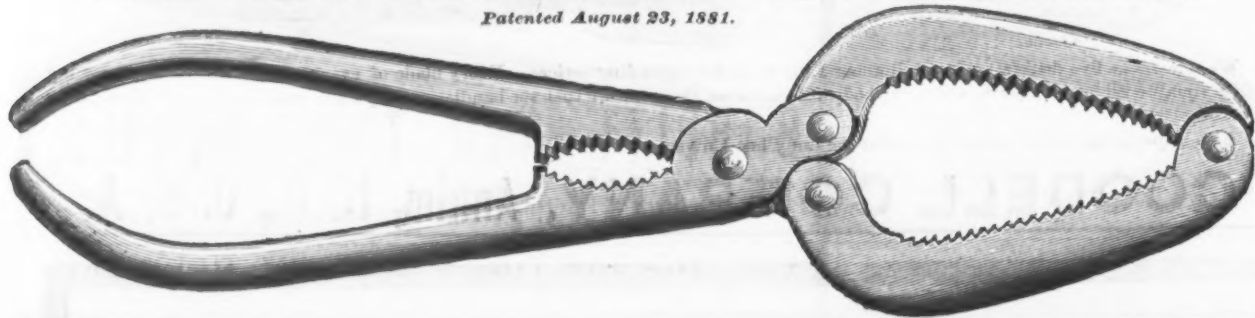
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Patented September 10, 1878.



THE NEW HERCULES NUT CRACKER.

Patented August 23, 1881.



They will Crack Hickory
Nuts with Ease.

With these Nut Crackers a child three years old can crack hickory nuts as well as a grown person, and no cracked fingers as with a hammer. Auxiliary Smaller Jaws for small nuts.

Manufactured only by

**THE RENZ HARD-
WARE CO.,**

BRIDGEPORT, CONN., U. S. A.

Warerooms,

32-36 Park Row, New York City.

BEARDSLEY SCYTHE COMPANY, West Winsted, Conn.

Manufacturers of the well-known brands of,

German Steel, Cast Steel and Silver
Steel Grass Scythes.

ALSO THE

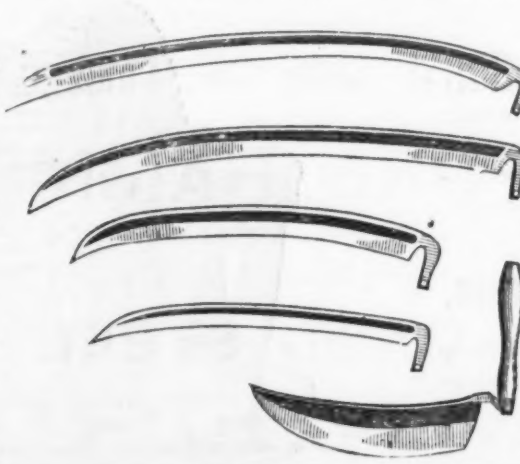
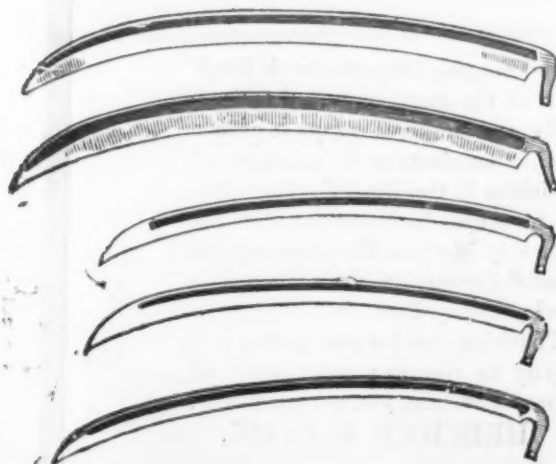
Clipper, Emperor, Beardsley's Golden Trimmer,
Conqueror, Dutchman, Waldron, &c.

ALSO

Silver Steel, Clipper & Harvest Victor Grain Scythes,
Common Pattern & Spear Point Hay Knives.

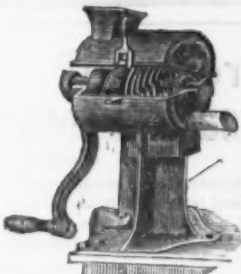
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Corn Knives, Bush & Weed Scythes.



Kieser's Gem. Kieser's No. 55

Double
Shearing
Cut.
Solid
Cast
Steel
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Family Meat Cutters are the best made.

Every family should have one. Will thoroughly cut Raw or Cooked Beef or Pork, Vegetables, Coconuts, Pine Apples, &c. Will cut forty pounds sausage meat an hour.
Every Druggist should have one for cutting Roots, Vanilla Beans, &c.
Easily worked. Easily cleaned. Will not get out of order. Ask your dealer for them.
Send a postal for Circular with testimonials.
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But with capacity to cut 100 pounds
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Our No. 1 Butcher, for hand or power, will cut 300 pounds an hour.
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We warrant our Cutters to do the work more thoroughly than any other machine made.

Also Sole Manufacturers of

KIMBALL'S PATENT SHOVELS & SPADES,
BOSS PATENT MOLASSES GATES,
LOCKWOOD'S PATENT HOES.

KIMBALL SHOVEL CO.,

Office, No. 67 German St., Baltimore, Md.

Established 1855.

KEYSTONE WORKS.

Centennial Award 1876.

GEORGE GRIFFITHS,

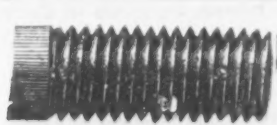
MANUFACTURER OF

Shovels,
Spades,
Scoops,
Coal Hods, &c.,

Nos. 511, 513 and 515 Locust St.,

PHILADELPHIA, PA., U. S. A.

Send for Price List.



TURNED
MACHINE SCREWS,
One sixteenth to five-eighths diameter.
Best and points to sample.
IRON, STEEL AND BRASS.

JOHN FELLOWS,



(Successor to LYON & FELLOWS.) Factory and Office, 14 Durham Place, Williamsburgh, N. Y.

CLARK'S



IMPROVED SCREW DRIVER,

And Case containing Handle and Set of

SCREW DRIVERS.

The Blades are made of JESSOP'S CAST
STEEL, with milled Points and Shanks, making
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This Driver has four Blades from 1/4 Inch to
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ALSO MANUFACTURER OF WILLIAM A. CLARK'S
Expansive Bit,
with two Cutters, boring from 7-8 to 3 inches.

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Manufacturers of "DeLancey" Patent Adjustable Planes.

FACTORIES

New Britain, Conn.

WAREHOUSES,

29 Chambers St.,
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PERSONAL INSURANCE

IN ALL BEST FORMS,

LIFE AND ACCIDENT.

'The Travelers,'

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Cash Capital, - - \$600,000
Cash Assets, over - - 5,800,000
Surplus to Policy Holders 1,435,000

LIFE AND ENDOWMENT POLICIES

Of all safe and well-approved forms. Cash
Insurance at low Cash Rates. Plain con-
tract, ample security, prompt payment, and
equitable surrender value.

Life Policies in Force, over 12,000
Claims Paid in Life Dep't, \$1,750,000

General Accident Policies

By the Year or Month, insuring against
death by accident, or Weekly Indemnity in
case of wholly disabling injury. Cost but
little money, and written by Agents at short
notice.

No. Accident Policies issued, 690,000
No. Accident Claims paid, 62,000
Amt. Accident Claims paid, \$4,375,000

LIFE AND ACCIDENT COMBINED,

Giving complete protection for life and limb
under one contract. Costs about the same
as ordinary mutual rate for Life Policy
alone.

REGISTERED ACCIDENT TICKETS,

Insuring \$3000 against fatal accident, or
\$15 a week for total disability, at 25 Cts.
a day, or \$4.50 for 30 days. Sold at
Railway Stations and at Agencies generally.
Much used by travelers, but not limited to
accidents of travel.

Money, Time, Life are lost by
Accidents.

MORAL: Insure in The Travelers.

JAMES G. BATTERSON, Pres't.

Rodney Dennis, Sec'y.

John E. Morris, Asst. Sec'y.

New York City Office,

TRIBUNE BUILDING,

R. M. JOHNSON, Manager.

AGENTS NEARLY EVERYWHERE.

Apply to any Agent,

OR TO THE

Home Office, HARTFORD.

DUNNING FINISHED STEEL HORSE SHOES.

The most popular Horse Shoe in the world. Will outwear three Iron Shoes.

Dunning Steel Finished Horse Shoes may be ordered in any quantity, packed, assorted sizes to suit, from the following hardware houses:

SIMMONS HARDWARE CO., St. Louis.

HIBBARD, SPENCER & CO., Chicago.

S. D. KIMBARK, Chicago.

JONES & LAUGHLIN, Chicago.

KELLY, MAUS & CO., Chicago.

PARKHURST & WILKINSON, Chicago.

W. B. BELKNAP & CO., Louisville.

NICHOLS & DEAN, St. Paul.

H. KAHLO & CO., Toledo.

W. J. HOLLIDAY & CO., Indianapolis.

COOMBS & CO., Fort Wayne.

GEORGE TRITCH, Denver.

STEVENS & GARRIGUES, Leavenworth.

B. D. WEST & ROSE,

97 Liberty St., New York.

LOCKE, HALE & CO.,

22 Tyler St., San Francisco

Send for sample keg, assorted sizes. Full descriptive catalogues sent on application. Manufactured exclusively by

THE CHICAGO STEEL HORSE SHOE CO., Chicago, Ills., U. S. A.

FACTORY AT PULLMAN (NEAR CHICAGO), ILLS.

THE HARTFORD HAMMER CO.,

Successor to THE HAMMOND HAMMER CO.,

MANUFACTURERS OF

SOLID CAST STEEL HAMMERS,

Adze Eye and Bell Faced Nail Hammers, Machinists' and Blacksmiths' Hammers.

The attention of the trade is called to this line of goods as superior in style, quality and workmanship to any in market.

Lists furnished on application.

Hartford, Conn., U. S. A.

For Sale by C. E. JENNINGS & CO., 96 Chambers St., New York, and the Trade generally.

CHAMPION ONE-MAN SAW



WITH PATENT ADJUSTABLE ATTACHMENT. The only Saw that can be adjusted for either a One-Man or a Two-Man Saw. We make the following lengths, 3½, 4, 4½, 5 feet. Send for sample.

WHEELER, MADDEN & CLEMSON MFG. CO., Middletown, N. Y.

HARVEY W. PEACE, VULCAN SAW WORKS

BROOKLYN, E. D., N. Y.,

Manufacturer of First Quality

HAND, PANEL, AND RIP SAWS,

AND KINDRED GOODS;

Also, MILL, CROSS-CUT AND CIRCULAR SAWS.

BAND SAWS A SPECIALTY.

ESTABLISHED 1836.
SHELTON & CO.,
Manufacturers of every variety of



Carriage, Tire, Machine, Plow, Stove and Spring Bolts, Coach and Bed Screws, &c.

BIRMINGHAM, CONN.

Flagler, Forsyth & Bradley, Agents, 298 Broadway, New York.

Armstrong's Improved Adjustable Stock and Dies
FOR PIPE AND BOLTS.



Tapped to the U. S. and Whitworth Standard Gauges. Adjustable to all variations in the size of fittings. Can be resharpened without drawing the temper by simply grinding them. Possessing practical advantages appreciated by all mechanics. Circular and Price List sent free on application.

Manufactured by F. ARMSTRONG, 30 Sterling St., Bridgeport Conn.

Are forged from a solid bar of steel. Afford a firm level bearing, thereby securing to the horse the most natural position for comfort and speed. Is a self-cleaning shoe, and will not "ball up." Equally good for summer or winter use. Will prevent horses from "calking" or growing corns. Can be resharpened as readily as an iron shoe.

OPINIONS.

I do not hesitate to give it as my opinion that it combines more excellences than any I have before seen. It provides a solid base under all circumstances, for the horse while standing or traveling; has no rocking motion while the animal is turning, and possesses eleven calks to protect him from falling. I have never seen the inventor of this improvement, but I desire, in the interest of the noblest animal living, to thus thank him for the good his shoe is likely to bring him.

HENRY BERGH,
President the American Society for Prevention of Cruelty to Animals, New York.

OFFICE OF NORTH CHICAGO CITY R. R. CO.,
CHICAGO, Feb. 16, 1881.
CHICAGO STEEL HORSE SHOE CO.—Gents: We are using your "Dunning Steel Horse Shoe" on our car horses, and find they last us from three to four months before being worn out. We drive our horses about 15 miles a day—half over cobble stones and balance pavement. We consider them the best shoe made.
M. W. SQUIRES, Supt.

Nos. 56 to 68 W. VAN BUREN ST.,
CHICAGO, Feb. 26, 1881.
CHICAGO STEEL HORSE SHOE CO.—Gents: I have used the Dunning Steel Shoe on my horses with great satisfaction. I regard it as the most practical and valuable improvement yet made in Horse Shoes. I am sure they will commend themselves to owners and shoers. Yours truly,
A. W. KINGSLAND,
Secretary Northwestern Horse Nail Co.

Secretary Northwestern Horse Nail Co.

UNITED STATES SMELTING WORKS,

MANUFACTURERS OF



BABBITT AND TYPE METALS,

Brass Castings and Solders of all Kinds.

PIC AND BAR TIN.

PIC AND BAR LEAD.

Pig Brass and Copper, Spelter, Antimony, &c.

1615 & 1617 Spring Garden Street,

PHILADELPHIA.

GEORGE HUNT.

M. S. STOKES.

Gentlemen.—This cut illustrates our

CAST IRON

Furnace Lamps

which are superceding entirely the Tin Lamps wherever introduced, in consequence of their durability. They are now extensively used in the Iron Districts of Ohio and some in Pennsylvania. We call your attention to and solicit your order for them, confidently asserting that they are an A No. 1 article in every respect.



Sample sent if desired.
PRICE, \$12 PER DOZEN.

Taylor & Boggis,
CLEVELAND, O.

GREENFIELD TOOL CO.,

(GREENFIELD CUTLERY CO.)

Greenfield, Mass., U. S. A.,

MANUFACTURERS OF



Fine Table Cutlery.

Solid Handled, Bone, Ivory, Rubber and Wood, Solid Steel Silver Plated.



PATENT CONCAVE FORGED OX SHOES.

Also, FLAT SHOES with

TWO CALKS at same price.

ALSO,

PLANES, PLANE IRONS, &c.

THE AMERICAN MACHINE CO.,

MANUFACTURERS OF

HARDWARE SPECIALTIES.

Office and Factory: Lehigh Ave. and American St., Philadelphia. Branch House: No. 128 Chambers St., New York.

SPECIALTIES: Fluting Machines, Hand Fluters, Plaiting Machines, Christmas Tree Holders, Bickford Portable Pump, Mrs. Potts' Patent Cold-Handle "Crown" Irons, Ice Cream Freezers and Cake Mixing Machines.

M. L. EDWARDS,
SALEM, OHIO,
Maker of
MEAT CHOPPERS,
Lard Presses,
Sausage Stuffers,
Blacksmiths' Drills (three kinds), Improved Blacksmiths' Tuiere, Hub Box-ing Machines, Hollow Augers, Lightning Fodder Cutters.

John Carver,
MANUFACTURER OF
CAULKING IRONS,
Cotton, Freight and Hay Hooks,
No. 44 North Third Street,
Near First,
BROOKLYN, E. D.

HAMMOND'S
Window Springs
Lock and support upper and lower sashes—all sizes. Are very convenient, simple and durable. Sample to the Trade free.
W. E. HAMMOND,
Lewisberry, York Co., Pa.
Circulars give full instructions.

THE BEST
NUT TAPPING MACHINE
LATEST IMPROVEMENTS
PUDRY MACHINE CO.
53 CENTER ST. CLEVELAND O.

BELLAIRE NAIL WORKS,

PIG IRON AND NAILS,

Manufacture the Celebrated Brand of

BELLAIRE NAILS

Office and Works, - - BELLAIRE, OHIO.

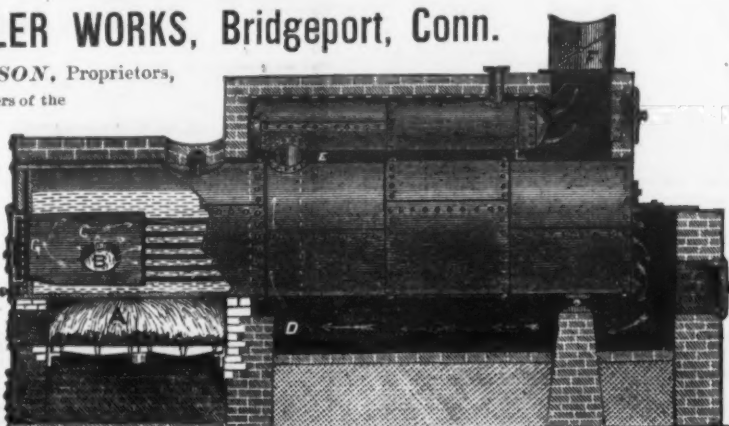
BRIDGEPORT BOILER WORKS, Bridgeport, Conn.

LOWE & WATSON, Proprietors,

Manufacturers of the

Low Patent
**TUBULAR
BOILER.**

Fourteen years' use proves them the most desirable and reliable boiler known. Gives dry steam. The process for the combustion of the gases is in the construction and setting. Burns any fuel, obtains as much result from it as any boiler or setting, with no more cost and greater durability. Send for descriptive circular.



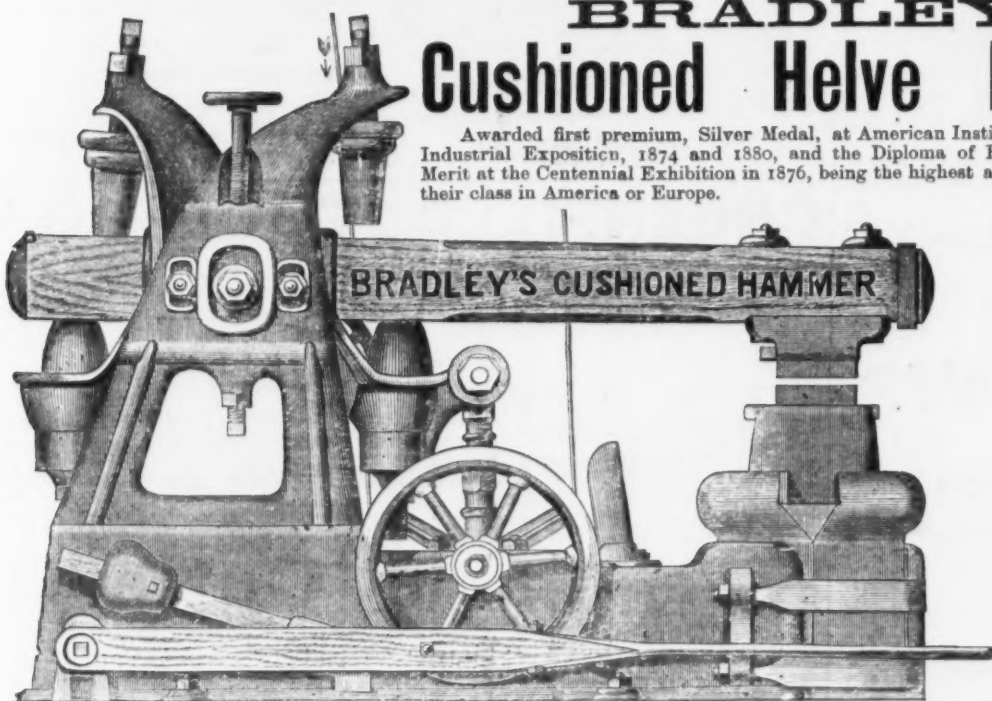
100,000,000
Hill's Triangular Hog Rings
Sold in 9 Years.



IMPROVED HOG RINGER
Is the only Adjustable One Clothing
Three Sizes of Rings.

BRADLEY'S Cushioned Helve Hammer.

Awarded first premium, Silver Medal, at American Institute Fair, 1873, Cincinnati Industrial Exposition, 1874 and 1880, and the Diploma of Honor and Grand Medal of Merit at the Centennial Exhibition in 1876, being the highest award given any goods of their class in America or Europe.



IT HAS MORE GOOD POINTS,
DOES MORE AND BETTER WORK,
TAKES LESS POWER,
COSTS LESS FOR REPAIRS,
THAN ANY HAMMER IN THE WORLD.
Guaranteed as Represented.
BRADLEY & COMPANY,
Established 1832.
SYRACUSE, N. Y.

B. FITTS' PATENT MAGNETIC METAL SEPARATOR.

MAGNETIC METAL SEPARATOR.

The accompanying cut represents a view of a recently invented machine for separating iron turnings, filings, &c., from brass, composition and other material. Its capacity and utility for this kind of work surpasses anything ever before offered to the public, doing its work most thoroughly, and with the least amount of labor or trouble. The machine is not only a great labor-saving device, but brass stock treated with it is much improved, as it is thoroughly cleansed that it may be used for the best of work.

The machine may also be used for separating iron from emery.

TESTIMONIALS.

From the Walworth Manufacturing Co., Boston, Boston, Jan. 18, 1879.
Mr. Ezra Sawyer, Worcester: Of the many methods we have practised in separating iron from brass turnings and filings, we have found none equal to your machine. Very truly yours,
E. C. HAMMER, Treas.

From the Benedict and Burnham Mfg. Company, Waterbury, Conn., Aug. 19, 1879.

Ezra Sawyer, Esq., Worcester.—DEAR SIR: We have used your Magnetic Metal Separator several months; it works to our satisfaction, and we cheerfully give it our recommendation. Yours truly,
J. C. OTIS, Treas.

From Union Water Meter Company, Worcester. We have used one of B. Fitts' Patent Magnetic Metal Separators for eighteen months, and can recommend it as the best thing we have ever seen for separating metals, and have no doubt it has more than paid for itself in its use. UNION WATER METER CO.
Worcester, Sept. 1, 1879.

From Peck Brothers & Co., New Haven, Conn., New Haven, Conn., Sept. 2, 1879.
Ezra Sawyer, Esq.—DEAR SIR: We are pleased to inform you that the machine we purchased of you for cleaning our turnings and sweepings works admirably, and does its work thoroughly. It will very soon earn all it cost us. Respectfully yours,
J. M. PECK, Treas.

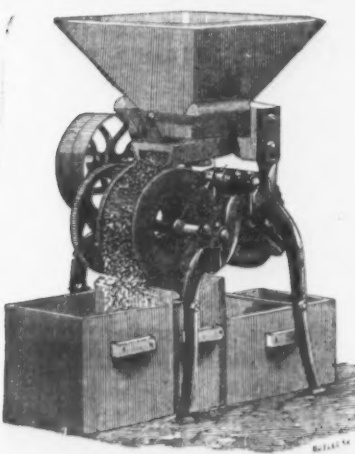
From Rice, Barton & Fales Machine and Iron Co., Worcester, Mass., Sept. 4, 1879.

Worcester, Mass.—DEAR SIR: We have had in use for several months one of B. Fitts' Patent Magnetic Metal Separators, and it gives us satisfaction, effecting a saving in time and material. Yours respectfully,
GEO. M. RICE, Treas.

From Brown & Brothers, Waterbury, Conn., Waterbury, Conn., Sept. 4, 1879.
Ezra Sawyer, Esq., Worcester.—DEAR SIR: We have used your Magnetic Metal Separator several months; it works to our satisfaction, and we cheerfully give it our recommendation. Yours truly,
H. VAN DUSEN, Asst. BROWN & BROTHERS.

Manufactured by

EZRA SAWYER, 33 Hermon Street, WORCESTER MASS.



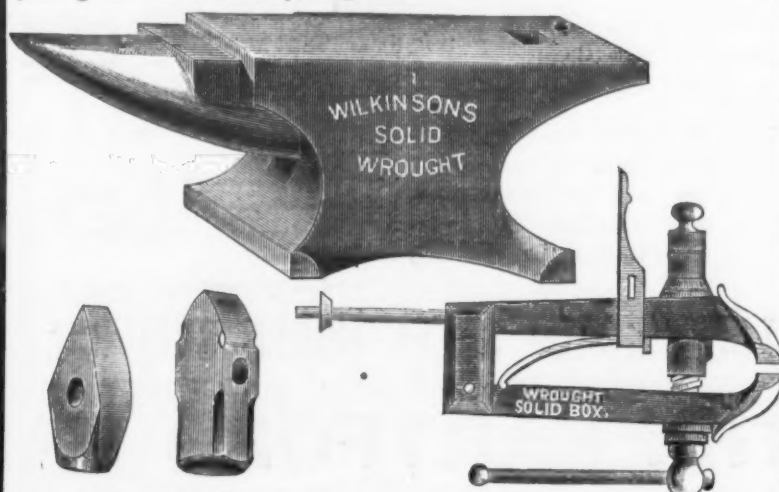
ANVILS & VISES.

Joshua Wilkinson & Sons,
DUDLEY, ENGLAND.

Manufacturers of

Solid Wrought Steel Face Anvils,
Wrought Solid Box Vises,
Wrought Steel Face Hammers.

In quality and finish, and in the mode of manufacture, these goods are identical with "Wrights," being made by the same workmen in adjoining factories at Dudley, England.



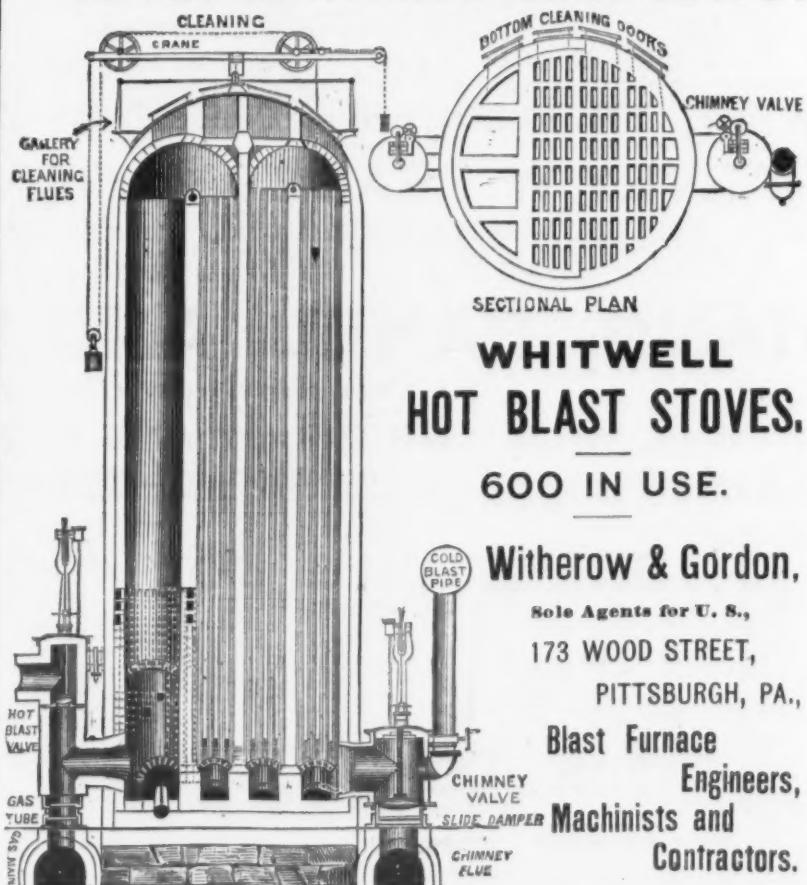
A full assortment will be kept in stock by the Agents, and deliveries made in large lots, f. o. b. at Liverpool, New York or Philadelphia. Small lots delivered from Warehouse at Philadelphia only.

NEWLIN & YARDLEY,
Sole Agents for the United States,
PHILADELPHIA.

Agents for "CROWN" Crane Chains, and
"Best Proved" Chains of all sizes.

NEW YORK DEPOT: 83 Maiden Lane.
THOMAS S. NEWLIN,
Agent for New York City and New England States.
Deliveries for Middle, Western and Southern States made from Philadelphia.

50 PER CENT. SAVING OF FUEL.
50 PER CENT. INCREASE OF OUTPUT.



**WHITWELL
HOT BLAST STOVES.**
600 IN USE.

Witherow & Gordon,
Sole Agents for U. S.,
173 WOOD STREET,
PITTSBURGH, PA.,
Blast Furnace
Engineers,
Machinists and
Contractors.

JOHN S. FRAY,

Successor to FRAY & PIGG, Bridgeport, Ct.

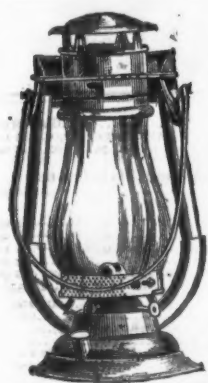


Spofford Bit Brace.

The Spofford Bit Brace is made under Letters Patent of the U. S. A., granted to N. Spofford, March 23, 1880, assigned to Fray & Pigg, and now held by John S. Fray, Jr. Fray having retired from the firm.

Spofford Sleeve Brace.

The Spofford Sleeve Brace is made under Letters Patent of the U. S. A., granted to N. Spofford, March 23, 1880, assigned to Fray & Pigg, and now held by John S. Fray, Jr. Fray having retired from the firm.

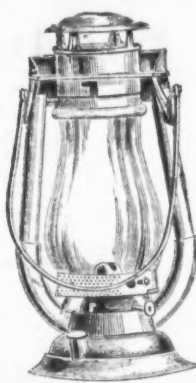


MILLER'S NO. 14 LANTERN

Gives more light and will hold the flame more perfectly than any other Lantern made.



For Prices and Samples, address
Edw'd Miller & Co.,
Meriden, Conn.,
OR
35 Warren St.,
New York.



Manufacturers of
Lanterns,
Brass Kettles,
Machine Oilers,
Kerosene Goods,
Tinner's Trimmings,
&c., &c.



AKRON IRON COMPANY, AKRON, OHIO,

Sole Manufacturers of

Patent Hot Polished Shafting.

Medal of Superiority awarded at American Institute Fair of 1880.

This Shafting is superior to any in the market, and commends itself to the trade for the following reasons, viz:

- 1st. It is perfectly straight and round.
- 2d. It can be finished accurately to any desired gauge.
- 3d. It will not rust or tarnish easily.
- 4th. It will not warp or spring in key seating.
- 5th. Its surface is composed of magnetic oxide of iron, and consequently presents a journal or bearing surface that is unexcelled.
- 6th. The peculiarity of its manufacture is such as to entail loss in making it, if other than superior stock is used. Those purchasing it may therefore be assured of receiving first-class material.

Price lists, catalogues and references furnished on application.
Where parties desire it we cut keyways or splines any length required, at a moderate charge.

AKRON IRON CO., Akron, Ohio.

AGENTS:

E. P. BULLARD, 14 Dey Street, N. Y.
S. E. BLISS, 89 Lake Street, Chicago, Ill.
D. N. BROWN MACHINERY CO., St. Louis, Mo.
J. H. KERRICK & CO., Indianapolis, Ind.
JOSHUA HENDY, San Francisco, Cal.

TRENTON LOCK & HARDWARE CO., TRENTON, N. J.

MANUFACTURERS OF

DOOR LOCKS AND HARDWARE,

BRONZED IRON AND BRONZE METAL DOOR TRIMMINGS, BUTTS AND HARDWARE.

CAST BUTTS, DOOR BOLTS, WELL WHEELS, FLUSH BOLTS, SHUTTER BOLTS, PAD LOCKS,
BARN DOOR HANGERS, & RAIL, GRINDSTONE FIXTURES, SCREW & SIDE PULLEYS, NOISELESS PULLEYS, HAY FORK PULLEYS, SHELF BRACKETS,

PHILADELPHIA SLIDING DOOR HANGERS AND RAIL.

Having largely increased our facilities and line of goods, we invite the attention of the Trade.

Illustrated Catalogues Furnished on Application.

Agencies. { **James M. Vance & Co., No. 211 Market St., Philadelphia.**
James Marshall, No. 48 Warren St., New York.

THE STANLEY WORKS, Wrought Iron Butts, Hinges AND DOOR BOLTS,

MANUFACTURERS OF

Plain, Japanned, Bronzed and Plated.

FACTORIES:

WAREHOUSE:

New Britain, Connecticut.

79 Chambers St., New York.

THE GLOBE MANUFACTURING CO., Successors to THE MIDDLETOWN TOOL CO.

Manufacturers of

HARDWARE,

"Baldwin" Plane Irons.

(Every Iron of our make warranted a perfect cutter.) ALSO,
Galvanized Hammock or Boat Snaps and Gaff Topsail Self-mousing Ship Hooks, Har-
ness Snaps, Baby Snaps, Washer Cutters, Pocket Wrenches, Amateur Lathes, &c.

MIDDLETOWN, CONN.

Send for Catalogue and Discount Sheet.

SABIN MFG. CO., MONTPELIER, VT., MANUFACTURERS OF

DOUBLE-ACTING SPRING BUTTS,

SABIN'S LEVER DOOR SPRINGS, For heavy doors,

BOSS AND CROWN SPRINGS, For light doors.

Send for Catalogue. Represented in New York by **DAVID HYMES & CO., 99 Church St.**

GUN POWDER. Lafin & Rand Powder Co.

No. 29 Murray Street, New York,
Manufacture and sell the following celebrated brands of Sporting Powder known everywhere as
**ORANGE LIGHTNING,
ORANGE DUCKING,
ORANGE RIFLE**
more popular than any Powder now in use.
Blasting Powder and Electrical Blasting Apparatus.
Military Powder on hand and made to order.
SAFETY FUSE, FRICTIONAL & PLATINUM FUSES.
Pamphlets showing sizes of grain sent free.

Mineral Wool.

Patented May 31, 1870.

A fibrous material, encasing about 90 per cent. of its volume of air, and therefore a superior

NON-CONDUCTOR

OF

HEAT AND SOUND.

Being made from the slag of blast furnaces, it is fire-proof and durable in contact with heated surfaces. Readily applied.

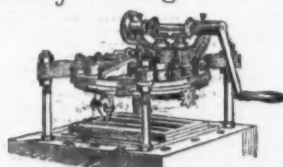
Heaviest grade about 25 lbs. per cubic foot. Price, 1 cent per lb.

U. S. MINERAL WOOL CO.,

16 Cortlandt St., New York.

Patent Portable Valve Seat

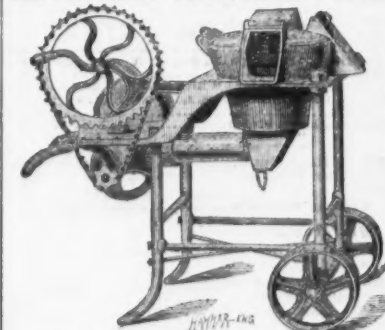
Rotary Planing Machine.



L. B. FLANDERS MACHINE WORKS,

1025 Hamilton St., Philadelphia, Pa.
Descriptive Circular on application.

KEYSTONE RIVETING FORGE.



An Improved Pattern.
Cheap and Durable.

BEST IN THE MARKET.

Send for catalogue to

KEYSTONE PORTABLE FORGE CO.,

204 North 4th St., Philadelphia, Pa.

MACHINERY FOR

Straightening and Cutting Wire

Of all Sizes to any Length.

Send for Catalogue.

JOHN ADT,

New Haven, Conn., U. S. A.



John Waldron,

Manufacturer of

Sprout's Double and

Single Shear

Horse Hay Forks

And

Sprout's

HAY ELEVATORS,

PULLEYS AND

GRAPPLES.

Send for Circulars.

Mauzy, Lycoming Co., Pa.

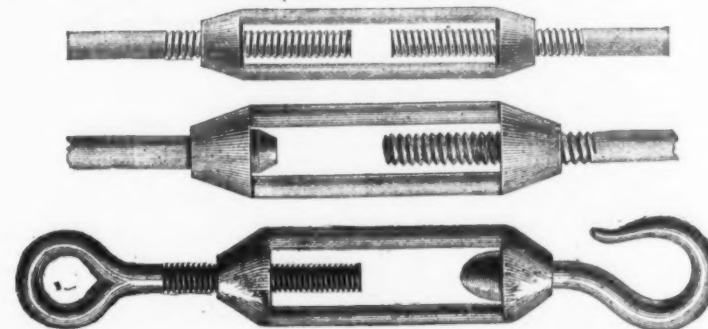
STOVE REPAIRS.

Repairs for Stoves made at Troy, Albany, Rochester, Cleveland, Buffalo, Boston, St. Louis, Quincy, Chicago, Milwaukee and elsewhere, at
W. C. MYERER,
127 W. Randolph St., Chicago, Ill.

Providence Tool Co.,

PROVIDENCE, R. I.

TURNBUCKLES.



Prices on Application.

HENRY B. NEWHALL, 105 Chambers St., NEW YORK AGENT.
J. H. WORK, 13 Pearl St., BOSTON AGENT.
S. H. & E. Y. MOORE, 163 & 165 Lake St., CHICAGO AGENT.

THE GENUINE STEBBINS MOLASSES & OIL GATES,

MANUFACTURED ONLY BY

E. STEBBINS MFG. CO.

BRASS FOUNDERS AND FINISHERS.

Sole Manufacturers

Stebbins and Bright-

wood

COMPRESSION

AND

GROUND KEY WORK.

Send for circular and price list.

H. M. BREWSTER, Agent

Brightwood P. O., Mass.

The Western trade can be supplied by
TREDWELL, COPPINS & CO., 130 Lake St., Chicago, Ill.

Office of NELSON LYON,

SOLE MANUFACTURER OF

Lyon's Patent Metallic Heel Stiffeners,

Also, Manufacturer of

BRUSHES

Of Every Description,

Nos. 17 & 19 Green St.,

Albany, N. Y., Dec. 8, 1880.

To All Whom it May Concern:

To-day a decree in my suit against G. T. Fisher & Co., of Detroit, for an infringement of my patent, was made and entered, of which the following is an extract:
At a session of the Circuit Court of the United States for the Eastern District of Michigan, held at Detroit, &c., on Wednesday, the 8th day of December, 1880. Present, Hon. H. B. Brown, District Judge.

NELSON LYON
against
GUYTON T. FISHER, et al.

It is ordered, adjudged and decreed, that the act entitled "An act for the relief of Nelson Lyon and Jeremiah S. James," passed by Congress and approved April 1, 1880, &c., is a good, valid and constitutional act.

That the original patent, bearing date July 9, 1879, and numbered 128,843, granted and issued to Joseph Barsaloux, Jeremiah S. James and Nelson Lyon, which corrected by the Acting Commissioner of Patents, as directed by said act, was a good and valid patent.

That the said Joseph Barsaloux was the original and first inventor of the improvements in metallic stiffeners for boots and shoe heels mentioned and described in said letters patent.

That the said Nelson Lyon is the inventor of the improvements in metallic stiffeners for boots and shoe heels mentioned and described in said letters patent, and that the said improvements are his original and valid invention.

That the said Lyon is exclusively possessed of said Letters Patent and the invention thereby secured.

That the defendants, G. T. Fisher & Co., and each of them, have infringed upon the said patents and upon the exclusive rights of said Lyon under the same.

That said Lyon receive of said defendants all the profits, &c., they have made, and in addition thereto all the damages he has suffered by reason of the infringements by the defendants, and also the costs, charges and disbursements in the action.

It is also further ordered, adjudged and decreed, that a perpetual injunction be issued against said defendants, according to the prayer of the said complainant's bill.

You are also hereby notified that the perpetual injunction has been issued and served on the defendants.

All questions as to damages and settlements in relation to infringements under my patents must be addressed to and made with my attorney, WILLIAM H. KING, in my care at the above address.

NELSON LYON.

Wilson Bohannon,

Manufacturer of Patent

BRASS PAD LOCKS

For Railroad Switches, Freight Cars, and the Hand-

ware Trade. All sizes, with Brass and Steel Keys,

with and without chains.

Patent Horizontal Rim Cylinder Night Latch.

Self-adjusting to doors of any thickness, with Patent Stop and Drawer Back Key.

PASSENGER CAR LOCKS, Bronzed, Nickel-Plated and Japaned.

Catalogues and Samples sent upon application.

P. Beque...
Pine, Small, \$6.25; Med., \$7.00; Large, \$8.00, dis 10 %
Corbin's Patent, No. 1, \$9.00, dis 10 %

LAWN MOWS.

Pennsylvania, Philadelphia and Excelsior, new
lat.....dis 30 %

Leavenworth.....\$ per doz \$6.00—dis 30 %
Wood.....doz \$10.00—dis 30 %
Eureka, Tinned.....doz \$8.00—dis 30 %
Columbia.....doz \$8.00—dis 30 %
Sammla's.....No. 1, \$7.00; No. 2, \$12.00, 50 cts; dis 10 %
Townsend's Patent.....\$6.00 per doz, dis 33 1/3 %
Silent Chalk.....doz \$10.00—dis 30 %
List, Lake Champlain.....Nos. 1, 2, 3, \$3.00, \$5.00, \$7.00,
dis 30 %
Mason's.....doz \$10.00—dis 30 %
Wire Clothes, Galvanized.....each 25 cts net

Lockets and Latches.

Cabinets.....} Changes made in list price of
 Gaylord....." some numbers Jan. 1, 1891,
 Bridgeport.....dis 25 & 5 %
 W. C. Collins.....do 60 %
 A. E. Deitz.....do 10 %
Trunk, new list, Jan. 1, 1891.....dis 15 & 5 %
Lewiston & Co.'s List, Jan. 1 77.....dis 10 %
Round Key, No. 1 to 4.....dis 40 to 10 %
No. 14 to 15.....do 10 to 10 %
Flat Key.....do 10 to 10 %
A. E. Deitz, Flat Key.....do 30 to 35 %
Yale Lock Co., Flat Key.....do 40 %
Hickory.....do 40 %
"Petter" or "American".....do 40 %
Plate.....do 35 & 10 %
F. Manly's "Extender".....\$10.00 per doz, 12 1/2 %

DOOR LOCKS, ETC.

Brantford.....do 40 %
Norwalk.....do 40 %
Newfield.....do 40 %
R. F. Corbin.....do 40 %
Russell & Erwin.....do 40 %
Barnes.....do 40 %
Reading Hardware Co.....do 40 %
Trenton Lock Co.....do 40 %
Hall's.....do 40 %
Haliory, Wheeler & Co.....do 40 %
"Key," "Lock" & Co.....do 40 %
Yale Lock Co., "Standard".....do 40 %
"Home's".....do 30 %
Comstock.....do 30 %
Doyle.....do 30 %
A. E. Dietz.....do 35 %

Lustror,—4 oz. bottles, per doz, \$2; per gro, \$18.00

Mallets.—Hickory.....dis 10 to 5 %
Penfield Block Co., Lig., Apple & Hickory.....dis 30 %

Meat Utensils.

Dixon's (P. S. & W.) Nos. 1.....3 do 30 %
 \$7.00, \$14.00, 17.00, 19.00, 20.00
Miller's Challenge.....Nos. 1 2 3
 \$5.00, \$12.00, 15.00, 17.00, 19.00, 20.00, 21.00, 22.00, 23.00, 24.00, 25.00, 26.00, 27.00, 28.00, 29.00, 30.00, 31.00, 32.00, 33.00, 34.00, 35.00, 36.00, 37.00, 38.00, 39.00, 40.00, 41.00, 42.00, 43.00, 44.00, 45.00, 46.00, 47.00, 48.00, 49.00, 50.00, 51.00, 52.00, 53.00, 54.00, 55.00, 56.00, 57.00, 58.00, 59.00, 60.00, 61.00, 62.00, 63.00, 64.00, 65.00, 66.00, 67.00, 68.00, 69.00, 70.00, 71.00, 72.00, 73.00, 74.00, 75.00, 76.00, 77.00, 78.00, 79.00, 80.00, 81.00, 82.00, 83.00, 84.00, 85.00, 86.00, 87.00, 88.00, 89.00, 90.00, 91.00, 92.00, 93.00, 94.00, 95.00, 96.00, 97.00, 98.00, 99.00, 100.00

Perry's Nos. 1.....\$7.00, \$14.00, 17.00, 19.00, 20.00, 21.00, 22.00, 23.00, 24.00, 25.00, 26.00, 27.00, 28.00, 29.00, 30.00, 31.00, 32.00, 33.00, 34.00, 35.00, 36.00, 37.00, 38.00, 39.00, 40.00, 41.00, 42.00, 43.00, 44.00, 45.00, 46.00, 47.00, 48.00, 49.00, 50.00, 51.00, 52.00, 53.00, 54.00, 55.00, 56.00, 57.00, 58.00, 59.00, 60.00, 61.00, 62.00, 63.00, 64.00, 65.00, 66.00, 67.00, 68.00, 69.00, 70.00, 71.00, 72.00, 73.00, 74.00, 75.00, 76.00, 77.00, 78.00, 79.00, 80.00, 81.00, 82.00, 83.00, 84.00, 85.00, 86.00, 87.00, 88.00, 89.00, 90.00, 91.00, 92.00, 93.00, 94.00, 95.00, 96.00, 97.00, 98.00, 99.00, 100.00

Woodruff's (P. S. & W.) Nos. 100.....do 30 %

Hales'.....Nos. 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80 81 82 83 84 85 86 87 88 89 90 91 92 93 94 95 96 97 98 99 100

Rach.....\$7.00, \$14.00, 17.00, 19.00, 20.00, 21.00, 22.00, 23.00, 24.00, 25.00, 26.00, 27.00, 28.00, 29.00, 30.00, 31.00, 32.00, 33.00, 34.00, 35.00, 36.00, 37.00, 38.00, 39.00, 40.00, 41.00, 42.00, 43.00, 44.00, 45.00, 46.00, 47.00, 48.00, 49.00, 50.00, 51.00, 52.00, 53.00, 54.00, 55.00, 56.00, 57.00, 58.00, 59.00, 60.00, 61.00, 62.00, 63.00, 64.00, 65.00, 66.00, 67.00, 68.00, 69.00, 70.00, 71.00, 72.00, 73.00, 74.00, 75.00, 76.00, 77.00, 78.00, 79.00, 80.00, 81.00, 82.00, 83.00, 84.00, 85.00, 86.00, 87.00, 88.00, 89.00, 90.00, 91.00, 92.00, 93.00, 94.00, 95.00, 96.00, 97.00, 98.00, 99.00, 100.00

American.....Nos. 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80 81 82 83 84 85 86 87 88 89 90 91 92 93 94 95 96 97 98 99 100

Gach.....\$6.00, 7.00, 10.00, 15.00, 20.00, 25.00, 30.00, 35.00, 40.00, 45.00, 50.00, 55.00, 60.00, 65.00, 70.00, 75.00, 80.00, 85.00, 90.00, 95.00, 100.00

Kleiser's.....\$4.00 per doz, dis 40 %

Silver & Denialis.....do 40 %

Finnegan's.....do 40 %

No. 1.....do 40 %

Best Shear.....\$12.00, 15.00, 20.00, 25.00, 30.00, 35.00, 40.00, 45.00, 50.00, 55.00, 60.00, 65.00, 70.00, 75.00, 80.00, 85.00, 90.00, 95.00, 100.00

Mincing Knives.

m., (good quality) per gross, 1 blade, \$7; 2 blades, \$12
Blades, \$12
aircraft.....\$12
mitch's.....per doz, Single, \$1.35; Double, \$1.80; dis 10 %
Young Hdw. Co.....do 10 %

Terminus.....\$1.00, \$1.50, \$2.00, \$2.50, \$3.00, \$3.50, \$4.00, \$4.50, \$5.00, \$5.50, \$6.00, \$6.50, \$7.00, \$7.50, \$8.00, \$8.50, \$9.00, \$9.50, \$1

Rolling Door Wrought Brass.....	W 3 1/2	4 1/2	5 1/2	6 1/2	7 1/2	8 1/2	9 1/2	10 1/2	11 1/2	12 1/2	13 1/2	14 1/2	15 1/2	16 1/2	17 1/2	18 1/2	19 1/2	20 1/2	21 1/2	22 1/2	23 1/2	24 1/2	25 1/2	26 1/2	27 1/2	28 1/2	29 1/2	30 1/2	31 1/2	32 1/2	33 1/2	34 1/2	35 1/2	36 1/2	37 1/2	38 1/2	39 1/2	40 1/2	41 1/2	42 1/2	43 1/2	44 1/2	45 1/2	46 1/2	47 1/2	48 1/2	49 1/2	50 1/2	51 1/2	52 1/2	53 1/2	54 1/2	55 1/2	56 1/2	57 1/2	58 1/2	59 1/2	60 1/2	61 1/2	62 1/2	63 1/2	64 1/2	65 1/2	66 1/2	67 1/2	68 1/2	69 1/2	70 1/2	71 1/2	72 1/2	73 1/2	74 1/2	75 1/2	76 1/2	77 1/2	78 1/2	79 1/2	80 1/2	81 1/2	82 1/2	83 1/2	84 1/2	85 1/2	86 1/2	87 1/2	88 1/2	89 1/2	90 1/2	91 1/2	92 1/2	93 1/2	94 1/2	95 1/2	96 1/2	97 1/2	98 1/2	99 1/2	100 1/2	101 1/2	102 1/2	103 1/2	104 1/2	105 1/2	106 1/2	107 1/2	108 1/2	109 1/2	110 1/2	111 1/2	112 1/2	113 1/2	114 1/2	115 1/2	116 1/2	117 1/2	118 1/2	119 1/2	120 1/2	121 1/2	122 1/2	123 1/2	124 1/2	125 1/2	126 1/2	127 1/2	128 1/2	129 1/2	130 1/2	131 1/2	132 1/2	133 1/2	134 1/2	135 1/2	136 1/2	137 1/2	138 1/2	139 1/2	140 1/2	141 1/2	142 1/2	143 1/2	144 1/2	145 1/2	146 1/2	147 1/2	148 1/2	149 1/2	150 1/2	151 1/2	152 1/2	153 1/2	154 1/2	155 1/2	156 1/2	157 1/2	158 1/2	159 1/2	160 1/2	161 1/2	162 1/2	163 1/2	164 1/2	165 1/2	166 1/2	167 1/2	168 1/2	169 1/2	170 1/2	171 1/2	172 1/2	173 1/2	174 1/2	175 1/2	176 1/2	177 1/2	178 1/2	179 1/2	180 1/2	181 1/2	182 1/2	183 1/2	184 1/2	185 1/2	186 1/2	187 1/2	188 1/2	189 1/2	190 1/2	191 1/2	192 1/2	193 1/2	194 1/2	195 1/2	196 1/2	197 1/2	198 1/2	199 1/2	200 1/2	201 1/2	202 1/2	203 1/2	204 1/2	205 1/2	206 1/2	207 1/2	208 1/2	209 1/2	210 1/2	211 1/2	212 1/2	213 1/2	214 1/2	215 1/2	216 1/2	217 1/2	218 1/2	219 1/2	220 1/2	221 1/2	222 1/2	223 1/2	224 1/2	225 1/2	226 1/2	227 1/2	228 1/2	229 1/2	230 1/2	231 1/2	232 1/2	233 1/2	234 1/2	235 1/2	236 1/2	237 1/2	238 1/2	239 1/2	240 1/2	241 1/2	242 1/2	243 1/2	244 1/2	245 1/2	246 1/2	247 1/2	248 1/2	249 1/2	250 1/2	251 1/2	252 1/2	253 1/2	254 1/2	255 1/2	256 1/2	257 1/2	258 1/2	259 1/2	260 1/2	261 1/2	262 1/2	263 1/2	264 1/2	265 1/2	266 1/2	267 1/2	268 1/2	269 1/2	270 1/2	271 1/2	272 1/2	273 1/2	274 1/2	275 1/2	276 1/2	277 1/2	278 1/2	279 1/2	280 1/2	281 1/2	282 1/2	283 1/2	284 1/2	285 1/2	286 1/2	287 1/2	288 1/2	289 1/2	290 1/2	291 1/2	292 1/2	293 1/2	294 1/2	295 1/2	296 1/2	297 1/2	298 1/2	299 1/2	300 1/2	301 1/2	302 1/2	303 1/2	304 1/2	305 1/2	306 1/2	307 1/2	308 1/2	309 1/2	310 1/2	311 1/2	312 1/2	313 1/2	314 1/2	315 1/2	316 1/2	317 1/2	318 1/2	319 1/2	320 1/2	321 1/2	322 1/2	323 1/2	324 1/2	325 1/2	326 1/2	327 1/2	328 1/2	329 1/2	330 1/2	331 1/2	332 1/2	333 1/2	334 1/2	335 1/2	336 1/2	337 1/2	338 1/2	339 1/2	340 1/2	341 1/2	342 1/2	343 1/2	344 1/2	345 1/2	346 1/2	347 1/2	348 1/2	349 1/2	350 1/2	351 1/2	352 1/2	353 1/2	354 1/2	355 1/2	356 1/2	357 1/2	358 1/2	359 1/2	360 1/2	361 1/2	362 1/2	363 1/2	364 1/2	365 1/2	366 1/2	367 1/2	368 1/2	369 1/2	370 1/2	371 1/2	372 1/2	373 1/2	374 1/2	375 1/2	376 1/2	377 1/2	378 1/2	379 1/2	380 1/2	381 1/2	382 1/2	383 1/2	384 1/2	385 1/2	386 1/2	387 1/2	388 1/2	389 1/2	390 1/2	391 1/2	392 1/2	393 1/2	394 1/2	395 1/2	396 1/2	397 1/2	398 1/2	399 1/2	400 1/2	401 1/2	402 1/2	403 1/2	404 1/2	405 1/2	406 1/2	407 1/2	408 1/2	409 1/2	410 1/2	411 1/2	412 1/2	413 1/2	414 1/2	415 1/2	416 1/2	417 1/2	418 1/2	419 1/2	420 1/2	421 1/2	422 1/2	423 1/2	424 1/2	425 1/2	426 1/2	427 1/2	428 1/2	429 1/2	430 1/2	431 1/2	432 1/2	433 1/2	434 1/2	435 1/2	436 1/2	437 1/2	438 1/2	439 1/2	440 1/2	441 1/2	442 1/2	443 1/2	444 1/2	445 1/2	446 1/2	447 1/2	448 1/2	449 1/2	450 1/2	451 1/2	452 1/2	453 1/2	454 1/2	455 1/2	456 1/2	457 1/2	458 1/2	459 1/2	460 1/2	461 1/2	462 1/2	463 1/2	464 1/2	465 1/2	466 1/2	467 1/2	468 1/2	469 1/2	470 1/2	471 1/2	472 1/2	473 1/2	474 1/2	475 1/2	476 1/2	477 1/2	478 1/2	479 1/2	480 1/2	481 1/2	482 1/2	483 1/2	484 1/2	485 1/2	486 1/2	487 1/2	488 1/2	489 1/2	490 1/2	491 1/2	492 1/2	493 1/2	494 1/2	495 1/2	496 1/2	497 1/2	498 1/2	499 1/2	500 1/2	501 1/2	502 1/2	503 1/2	504 1/2	505 1/2	506 1/2	507 1/2	508 1/2	509 1/2	510 1/2	511 1/2	512 1/2	513 1/2	514 1/2	515 1/2	516 1/2	517 1/2	518 1/2	519 1/2	520 1/2	521 1/2	522 1/2	523 1/2	524 1/2	525 1/2	526 1/2	527 1/2	528 1/2	529 1/2	530 1/2	531 1/2	532 1/2	533 1/2	534 1/2	535 1/2	536 1/2	537 1/2	538 1/2	539 1/2	540 1/2	541 1/2	542 1/2	543 1/2	544 1/2	545 1/2	546 1/2	547 1/2	548 1/2	549 1/2	550 1/2	551 1/2	552 1/2	553 1/2	554 1/2	555 1/2	556 1/2	557 1/2	558 1/2	559 1/2	560 1/2	561 1/2	562 1/2	563 1/2	564 1/2	565 1/2	566 1/2	567 1/2	568 1/2	569 1/2	570 1/2	571 1/2	572 1/2	573 1/2	574 1/2	575 1/2	576 1/2	577 1/2	578 1/2	579 1/2	580 1/2	581 1/2	582 1/2	583 1/2	584 1/2	585 1/2	586 1/2	587 1/2	588 1/2	589 1/2	590 1/2	591 1/2	592 1/2	593 1/2	594 1/2	595 1/2	596 1/2	597 1/2	598 1/2	599 1/2	600 1/2	601 1/2	602 1/2	603 1/2	604 1/2	605 1/2	606 1/2	607 1/2	608 1/2	609 1/2	610 1/2	611 1/2	612 1/2	613 1/2	614 1/2	615 1/2	616 1/2	617 1/2	618 1/2	619 1/2	620 1/2	621 1/2	622 1/2	623 1/2	624 1/2	625 1/2	626 1/2	627 1/2	628 1/2	629 1/2	630 1/2	631 1/2	632 1/2	633 1/2	634 1/2	635 1/2	636 1/2	637 1/2	638 1/2	639 1/2	640 1/2	641 1/2	642 1/2	643 1/2	644 1/2	645 1/2	646 1/2	647 1/2	648 1/2	649 1/2	650 1/2	651 1/2	652 1/2	653 1/2	654 1/2	655 1/2	656 1/2	657 1/2	658 1/2	659 1/2	660 1/2	661 1/2	662 1/2	663 1/2	664 1/2	665 1/2	666 1/2	667 1/2	668 1/2	669 1/2	670 1/2	671 1/2	672 1/2	673 1/2	674 1/2	675 1/2	676 1/2	677 1/2	678 1/2	679 1/2	680 1/2	681 1/2	682 1/2	683 1/2	684 1/2	685 1/2	686 1/2	687 1/2	688 1/2	689 1/2	690 1/2	691 1/2	692 1/2	693 1/2	694 1/2	695 1/2	696 1/2	697 1/2	698 1/2	699 1/2	700 1/2	701 1/2	702 1/2	703 1/2	704 1/2	705 1/2	706 1/2	707 1/2	708 1/2	709 1/2	710 1/2	711 1/2	712 1/2	713 1/2	714 1/2	715 1/2	716 1/2	717 1/2	718 1/2	719 1/2	720 1/2	721 1/2	722 1/2	723 1/2	724 1/2	725 1/2	726 1/2	727 1/2	728 1/2	729 1/2	730 1/2	731 1/2	732 1/2	733 1/2	734 1/2	735 1/2	736 1/2	737 1/2	738 1/2	739 1/2	740 1/2	741 1/2	742 1/2	743 1/2	744 1/2	745 1/2	746 1/2	747 1/2	748 1/2	749 1/2	750 1/2	751 1/2	752 1/2	753 1/2	754 1/2	755 1/2	756 1/2	757 1/2	758 1/2	759 1/2	760 1/2	761 1/2	762 1/2	763 1/2	764 1/2	765 1/2	766 1/2	767 1/2	768 1/2	769 1/2	770 1/2	771 1/2	772 1/2	773 1/2	774 1/2	775 1/2	776 1/2	777 1/2	778 1/2	779 1/2	780 1/2	781 1/2	782 1/2	783 1/2	784 1/2	785 1/2	786 1/2	787 1/2	788 1/2	789 1/2	790 1/2	791 1/2	792 1/2	793 1/2	794 1/2	795 1/2	796 1/2	797 1/2	798 1/2	799 1/2	800 1/2	801 1/2	802 1/2	803 1/2	804 1/2	805 1/2	806 1/2	807 1/2	808 1/2	809 1/2	810 1/2	811 1/2	812 1/2	813 1/2	814 1/2	815 1/2	816 1/2	817 1/2	818 1/2	819 1/2	820 1/2	821 1/2	822 1/2	823 1/2	824 1/2	825 1/2	826 1/2	827 1/2	828 1/2	829 1/2	830 1/2	831 1/2	832 1/2	833 1/2	834 1/2	835 1/2	836 1/2	837 1/2	838 1/2	839 1/2	840 1/2	841 1/2	842 1/2	843 1/2	844 1/2	845 1/2	846 1/2	847 1/2	848 1/2	849 1/2	850 1/2	851 1/2	852 1/2	853 1/2	854 1/2	855 1/2	856 1/2	857 1/2	858 1/2	859 1/2	860 1/2	861 1/2	862 1/2	863 1/2	864 1/2	865 1/2	866 1/2	867 1/2	868 1/2	869 1/2	870 1/2	871 1/2	872 1/2	873 1/2	874 1/2	875 1/2	876 1/2	877 1/2	878 1/2	879 1/2	880 1/2	881 1/2	882 1/2	883 1/2	884 1/2	885 1/2	886 1/2	887 1/2	888 1/2	889 1/2	890 1/2	891 1/2	892 1/2	893 1/2	894 1/2	895 1/2	896 1/2	897 1/2	898 1/2	899 1/2	900 1/2	901 1/2	902 1/2	903 1/2	904 1/2	905 1/2	906 1/2	907 1/2	908 1/2	909 1/2	910 1/2	911 1/2	912 1/2	913 1/2	914 1/2	915 1/2	916 1/2	917 1/2	918 1/2	919 1/2	920 1/2	921 1/2	922 1/2	923 1/2	924 1/2	925 1/2	926 1/2	927 1/2	928 1/2	929 1/2	930 1/2	931 1/2	932 1/2	933 1/2	934 1/2	935 1/2	936 1/2	937 1/2	938 1/2	939 1/2	940 1/2	941 1/2	942 1/2	943 1/2	944 1/2	945 1/2	946 1/2	947 1/2	948 1/2	949 1/2	950 1/2	951 1/2	952 1/2	953 1/2	954 1/2	955 1/2	956 1/2	957 1/2	958 1/2	959 1/2	960 1/2	961 1/2	962 1/2	963 1/2	964 1/2	965 1/2	966 1/2	967 1/2	968 1/2	969 1/2	970 1/2	971 1/2	972 1/2	973 1/2	974 1/2	975 1/2	976 1/2	977 1/2	978 1/2	979 1/2	980 1/2	981 1/2	982 1/2	983 1/2	984 1/2	985 1/2	986 1/2	987 1/2	988 1/2	989 1/2	990 1/2	991 1/2	992 1/2	993 1/2	994 1/2	995 1/2	996 1/2	997 1/2	998 1/2	999 1/2	1000 1/2
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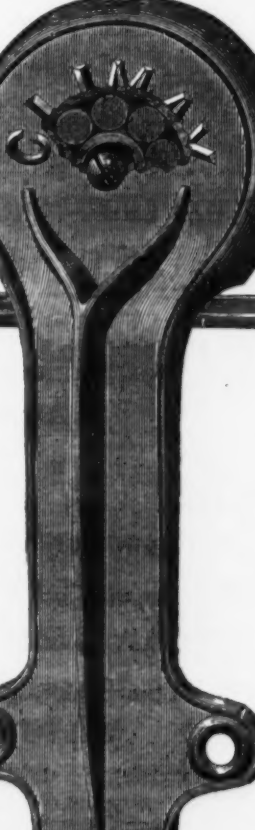
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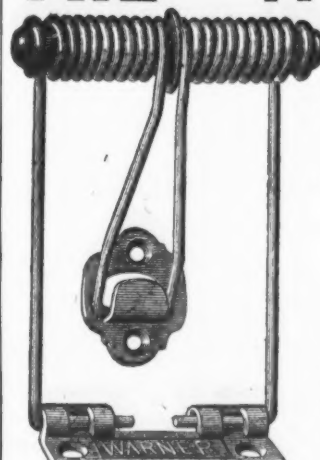
WM. F. FOREPAUGH, JR. & BROS.

Manufacturers of SUPERIOR OAK TANNED

LEATHER BELTING.

W. Cor. Randolph and Jefferson Sts., PHILADELPHIA.

THE "WARNER" DOOR SPRINGS



are the most simple, most effective and most convenient ever introduced, and the immense sale we are having shows their great popularity and superiority.

There never was a Spring made that is so durable, so complete in its action, operating with a uniform pressure, holding the door tight when closed, and allowing it to open without increasing the pressure at any point.

When the door is opened about 130 degrees of a circle, it will press and hold it open.

The Spring is easily unhooked and rehooked—in an instant—from the door and also from the jamb, without removing a screw or pin.

This is a Convenience Possessed by no other Spring in the Market.

We are making this season three sizes, viz:

No. 1 For Screen or Light Storm Doors.

No. 2 For Medium Doors.

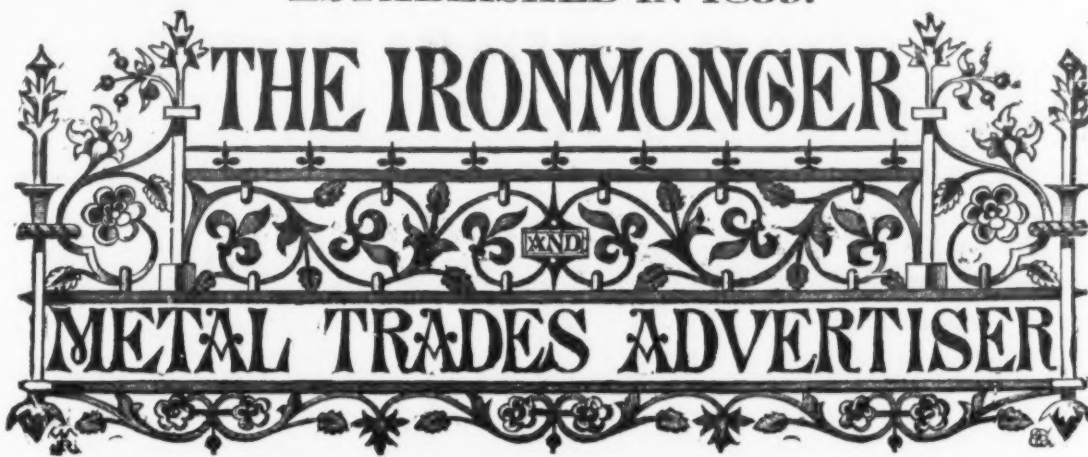
No. 3 For Heavy Doors.

They are for sale by most of the prominent jobbers of the United States and Canada.

Correspondence solicited.

FREDERIC BARTLETT,
FREEPORT, ILLINOIS.

ESTABLISHED IN 1859.



PUBLISHED EVERY SATURDAY.

THE OLDEST AND CHIEF REPRESENTATIVE OF THE IRON, HARDWARE AND METAL TRADES.

OFFICE: 44a CANNON STREET, LONDON, E. C.

ADVERTISEMENTS AND SUBSCRIPTIONS ARE RECEIVED AT THE VARIOUS OFFICES OF "THE IRON AGE," NAMELY:

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Manager.SOUTHERN OFFICE: Cor. Eighth and Market Streets, Char'a
nooga, Tenn.—S. B. LOWE, Manager.

SPECIAL FEATURES.

Notes of Novelties.—This is a department of the journal always watched with interest by the trade, as it contains an account, from week to week, of the novelties which manufacturers and inventors are introducing to the notice of the trade. These articles are freely illustrated.

Special Correspondents.—The Ironmonger has a deserved reputation for its special correspondence from all the principal Continental, British and manufacturing centers. The writers are gentlemen holding important positions in the districts with which they are connected, and possess facilities for acquiring information specially suited for the columns of the Ironmonger. The Weekly, Legal Notes, Trade Notes, Bankruptcies, Foreign Notes, Colonial Jottings, Merchants' Circulars, &c., are each departments of the journal, containing a digest of all matters of direct interest to the Iron, Hardware and Metal Trades. In addition to the above, there is a carefully classified list of Patents, together with Editorial Notes, French Belgian and other Special Correspondence.

SUBSCRIPTIONS

to the Ironmonger and Metal Trades' Advertiser, with which is sent every fourth week the Foreign Supplement (see below), may commence from any date, but are not received for less than a year complete. The rate is \$5 per annum, inclusive of postage to any part of the world outside Great Britain. To every subscriber is presented, free, in the course of his year, a handsome and useful Ironmongers' Diary and Text Book, a work sold to non-subscribers at 75 cents.

ADVERTISEMENTS

are inserted in the Ironmonger and Metal Trades Advertiser at the subjoined rates, from which no variation can be made on any ground whatever.

Size of Page—Nine Inches Deep by Six Inches Wide.

One Advertisement of every Series of 13 Monthly, 27 Fortnightly, or 53 Weekly, will be inserted in the Ironmongers' Diary and Text Book, published toward the end of each year, and presented to every Subscriber.

	53 INSERTIONS, each net.	27 INSERTIONS, each net.	13 INSERTIONS, each net.	7 INSERTIONS, each net.	3 INSERTIONS, each net.	1 INSERTION, net.
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SPECIAL ISSUES.

In the spring and autumn of each year there is published a Special Issue, the circulation of which is not less than Twelve Thousand (12,000) copies.

THE IRONMONGERS' DIARY AND TEXT BOOK.

This is an annual, presented free to every Subscriber to the IRONMONGER AND METAL TRADES' ADVERTISER. It contains a large number of ruled skeleton pages for diary and other entries, and in addition much useful reference information, varied from year to year. It is handsomely bound in cloth, gilt; and as copies are used in thousands of establishments for a whole year, it is obviously a medium of exceptional value for advertisements. Sold to non-subscribers at 75 cents.

THE FOREIGN SUPPLEMENT,

With which is incorporated The Universal Engineer.

Is published every fourth week in connection with the extensive and world-wide circulation of the Ironmonger itself. The dates of its publication for the next twelve months will be as follows: SEPTEMBER 17, OCTOBER 8, NOVEMBER 6, DECEMBER 3 and 31, 1881; JANUARY 28, FEBRUARY 25, MARCH 25, APRIL 22, MAY 20, JUNE 17, JULY 8 and AUGUST 5, 1882.

This Supplement is published in

FOUR LEADING COMMERCIAL LANGUAGES

of the world, including English, and is sent to all the countries where they are spoken, thus placing the contents of the Ironmonger not only within reach but in the native language of eighty millions of German, forty-two millions of French, twenty-eight millions of Italian, and fifty-one millions of Spanish speaking people; or, in all, over two hundred millions of inhabitants in the principal nations where the best purchasers of manufactured goods are to be found.

Advertisements are inserted in any language at the following

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Two-thirds page.....	22.00	24.75	27.50	7.50	8.45	9.40
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One-third page.....	12.50	14.10	15.65	3.20	3.40	4.00

Advertisers will do well to use illustrations freely. Where economy of space is an object, a left page illustrated and described in one language can be suitably described in four or more languages on the opposite or right page without illustrating.

THE WHOLE FOREIGN HARDWARE TRADE,

so far as our experience of twenty years is concerned, will be covered by THE FOREIGN SUPPLEMENT at least twice a year. Thus a Price List or Advertisement inserted in the Ironmonger and Foreign Supplement is a strikingly powerful and most efficient way of publicity not to be compared with any of the other ordinary channels of communication.

B. KREISCHER & SONS, FIRE BRICK.

BEST AND CHEAPEST.
Established 1845.
Office, foot of Houston Street, East River,
NEW YORK.

NEWTON & CO.,

ALBANY, N. Y., Manufacturers of

FIRE BRICK

Stove Linings,

Range and Heater Linings

Cylinder Brick, &c., &c.

For Glass and Steel Works.

SILICA,

Bricks and Cement,

English Fire Bricks.

RIMINGTON BROS. & CO.,

Newcastle-on-Tyne.

Agent on this side

S. A. RIMINGTON,

264 & 266 Water Street,

NEW YORK.

M. D. Valentine & Bro

Manufacturers of

FIRE BRICK

And Furnace Blocks

DRAIN PIPE & LAND TILE.

Woodbridge, - - - N. J.

BORGNER & O'BRIEN,

Manufacturers

FIRE BRICK

Edge Pressed Furnace Blocks,

CLAY RETORTS, TILES, &c.,

Twenty-third Street,

Above Race, PHILADELPHIA.

Twenty years' practical Experience.

WATSON FIRE BRICK CO.,

ESTABLISHED 1856.

Successors to JOHN R. WATSON, Perth Amboy, New Jersey.

Manufacturers of

FIRE BRICK,

OR ROLLING MILLS, BLAST FURNACES, FOUNDRIES, GAS WORKS, LIME KILNS, TANNERIES, BOILER AND GRATE SETTING, GLASS WORKS, &c. Fire Clays, Fire Sand, and Kaolin for Sale.

HENRY MAURER,

Proprietor of the

Excelsior Fire Brick & Clay

Retort Works,

Manufacturer of FIRE BRICK, HOLLOW

BRICK AND CLAY RETORTS.

WORKS: PERTH AMBOY, NEW JERSEY.

Office & Depot, 418 to 422 East 23d St., N. Y.

TROY FIRE BRICK WORKS,

Troy, N. Y.,

JAMES ONSTRANDER & SON,

ESTABLISHED 1848,

Manufacturers of

FIRE BRICK,

Tuyeres, Tiles, Blast Furnace Blocks, &c. Miners and

Disasters! 2 Woodbridge Fire Clay and Sand, and Staten

Island Kaolin.

Established 1864.

GARDNER BROTHERS,

Manufacturers of

STANDARD SAVAGE FIRE BRICK,

TILE & FURNACE BLOCKS,

OF ALL SHAPES AND SIZES.

Clay Gas Retorts and Retort Settings, and

Miners and Shippers of Fire Clay.

Office: 116 Smithfield St., Pittsburgh, Pa.

WORKS: Mt. Savage Junction, Md., and Lockport, Pa.

HALL & SONS,

Buffalo, N. Y.

CHAS. D. COLSON,

FIRE BRICK,

Foundry Facings, Sand, Tools and Supplies.

CHICAGO, ILL.

UNION MINING COMPANY,

Mount Savage Fire Brick.

EDWARD J. ETTING, Agent,

No. 230 South Third St., Philadelphia, Pa.

MILLER'S BRICK PRESSES

(Established 1844).

FIRE AND RED BRICK,

And Brickmakers' Tools in General.

SAML. P. MILLER & SON,

809 South 6th St., Philadelphia.

HENRY DISSTON & SONS,

KEYSTONE SAW, TOOL, STEEL & FILE WORKS,

Front and Laurel Streets,

PHILADELPHIA.

DISSTON'S SAMSON TREE PLANTER AND POST HOLE DIGGER.

Fig. 1.

Patented May 29, 1870.

Fig. 2.



Price, - - - \$37.50 per dozen.

No Farmer, Nurseryman, Railroad
or Telegraph Company
SHOULD BE WITHOUT ONE.

NO BACK-ACHE.

NO KNEE-WORK.

NO CLOGGING.

This tool has been thoroughly tested, and has given the greatest satisfaction to all who have tried it. The principle on which it works makes it self-cleaning and prevents adhesion in sticky soil; therefore it always works free and easy. It is far superior to all plungers, augers and boring machines, as it works well in stony, sandy, or clay soils; quicksand under water is as easily removed as though no water existed.



DIRECTIONS.

Plunge the Digger into the ground, as shown in cut, Fig. 1, and when the soil is loosened pull out the lever with one hand, as shown in cut, Fig. 2, which will press the dirt between the blades; then draw the Digger from the hole, keeping hold of the lever with one hand and the handle with the other. When the Digger is clear of the hole, you can deposit the load anywhere within reach by simply pressing down the lever, which will open the blades and the dirt will fall from between them. The Digger is then ready for another plunge. The steel blades are nine inches long, and the whole tool five feet long. For sale at Hardware and Agricultural Stores.

HENRY DISSTON & SONS.

THE STANDARD

WOOD TRACK

HANGER

OF

AMERICA.

For Sale by the Wholesale Trade
Generally, or the

KIDDER SLIDE DOOR HANGER CO.,

Sole Manufacturers,

ROMEO, MICHIGAN.



THE

"KIDDER."

Escutcheon Pins, Small Rivets and Screws,

And Specialties in this line made to order by

BLAKE & JOHNSON,
WATERBURY, CONN.

BOLSTER SPRINGS FOR FARM WAGONS.

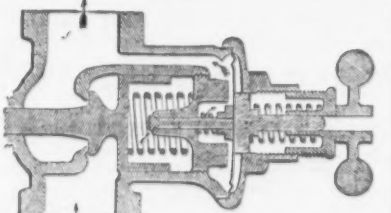
Made of Best Oil Tempered Steel.

The ONLY RELIABLE Bolster Spring in Use.



They save largely from wear and tear in every part of the Wagon. They remove all necessity for a Spring Seat. They convert a common Lumber Wagon into a Spring Wagon, making it equally comfortable for from one to twenty persons. They are admirably adapted to the wants of Fruit and Vegetable Growers. They are suited to all makes and sizes of Farm Wagons, and can be attached by any one. They make the cheapest and easiest riding Spring Wagon in the market. These Springs have been in practical use for over four years, and are a pronounced success. No Farmer or Farmer can afford to be without them. We want Agents everywhere. Send for description and prices, and mention this paper.

SEMPLE & BIRGE MFG. CO., ST. LOUIS, MO.



Curtis Pressure Regulator.

Is made entirely of metal; occupies the same space as a globe valve. It has no glands or packing, and is a lock-up valve. Write for circular. Manufactured by

CURTIS REGULATOR CO.,

59 Beverly Street, BOSTON, MASS.

HOWARD IRON WORKS,

BUFFALO, N. Y.,

Manufacturers of

BENCH VISES,

Price Lists sent on application.

ROCKING BLOCK GRATE,

Williams' Patent,

J. Q. MAYNARD,

General Agent.

97 Liberty Street, NEW YORK.

Fire level. Accumulation of cinders impossible. No cleaning out of fires during the day. Parts easily and cheaply replaced. Seventy per cent. of air space. Thirty days' trial. Send for circular.

GREEN'S PURE SILICA FIRE BRICK,

MADE BY

LACLEDE FIRE BRICK MANUFACTURING CO.,

SPECIALLY ADAPTED FOR

Pernot and Siemens Open Hearth
Steel Furnaces and for Glass Furnaces.

Office, 901 Pine St., St. Louis, Mo.

REMOVAL.

Please notice that we have removed from No. 295 THIRD AVENUE to

No. 37 Warren Street, near Church St.,

Where we hope to be favored with a continuance of your generous patronage.

J. M. FARRINGTON & CO.,

Successors to DAY, FARRINGTON & CO., Manufacturers of

LOCKS, KNOBS, GONGS, BLANK KEYS,

Wrought Store Door and Flush Bolts, Silver Plated, Ornamental Bronze and other Hardware.

DAVID HYMES & CO.,

92 Church Street, New York,

JOB LOTS OF HARDWARE & CUTLERY.

John T. Lewis & Bros.

No. 231 South Front St.,

PHILADELPHIA.

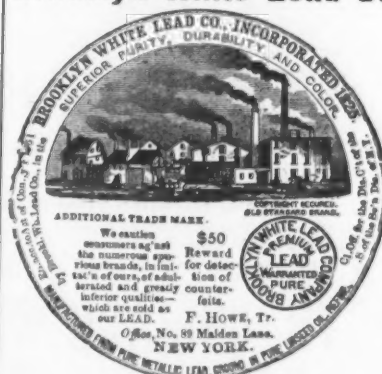


TRADE MARK.

MANUFACTURERS OF

Pure White Lead, Red Lead, Litharge,
Orange Mineral, Linseed Oil,
AND PAINTERS' COLORS.

Brooklyn White Lead Co.



TRADE MARK

White Lead, Red Lead & Litharge.

No. 182 Front Street,

NEW YORK.

JOHN JEWETT & SONS,

Manufacturers of the well-known brand of

WHITE LEAD.



TRADE MARK

ALSO MANUFACTURERS OF

LINSEED OIL.

182 Front Street, NEW YORK.



The Atlantic White Lead and
Linseed Oil Co.,

Manufacturers of

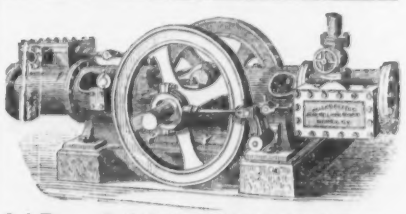
White Lead (Atlantic), Red Lead, Lith-
arge, Glass Makers' Litharge and
Orange Mineral;

LINSEED OIL,

Raw, Refined and Boiled.

ROBERT COLGATE & CO.,

287 Pearl St., NEW YORK.



AIR COMPRESSORS.

ALLEN'S

HIGH SPEED AIR COMPRESSORS,

With Positive Moving Valves.

Allen Engines, Stationary and Marine Boilers,

Hoisting Machinery. Also, Patent Evaporators and

Condensers for Animal Matters.

AIR COMPRESSORS A SPECIALTY.

JOHN McLAREN,

River Street, - - - HOBOKEN, N. J.

WILLIAM H. AINLEY, Chairman.

PETER D. WATSON, Sec. and Treas.

Mellert Foundry & Machine Co.,

(Works Established at Reading, Pa., in 1848.)

Manufacturers of

CAST-IRON WATER PUMP

Specials, Flange Pipe, Retorts, Valves and Hydrants,

Lump Pumps, &c. The Improved Canadian Tur-

bine Water Wheel. Machinery and Castings

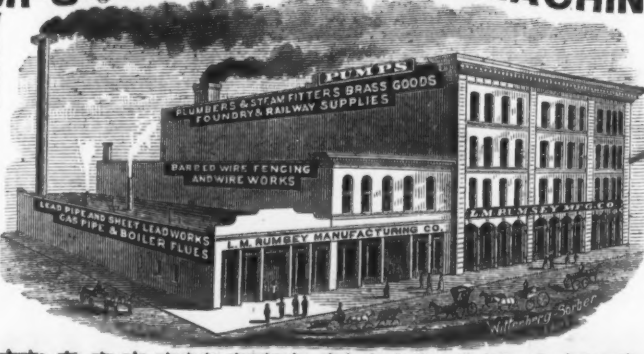
for Furnaces, Rolling Mills, Grist and Saw Mills, Min-

ing Pumps, Hoists, &c. Columns, Brackets, Iron

Railings, &c.

ARNOLD MELLERT, Capt., Reading, Pa.

L. M. RUMSEY MFG. CO.
MANUFACTURERS & JOBBERS OF
PUMPS & IRON WORKING MACHINERY,



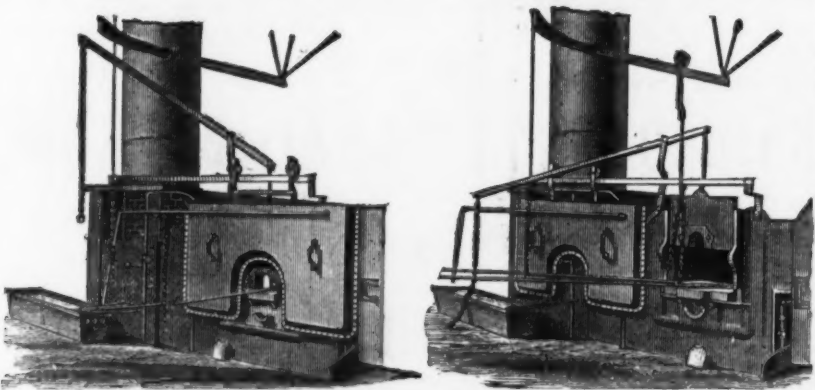
LEAD PIPE & SHEET LEAD
PLUMBERS & STEAM FITTERS
BRASS GOODS
BARBED WIRE FENCING
& FENCE WIRE

GAS PIPE & FITTINGS
BELTING
HOSE
PACKING
PUMP
CHAIN & C.

RAILWAY SUPPLIES
No. 804 TO 820 N. SECOND ST.
ST. LOUIS, MO.

AMERICAN BOLT CO., Lowell, Mass.,
MANUFACTURERS OF
Bolts, Nuts, Washers, Chain Links, Car
Bolts, Bridge Bolts, Lag Screws, &c.

MCDONALD'S PATENT SHIELD.



For Protecting the Men from Heat when Working in Front of
Puddling, Heating and other Furnaces.

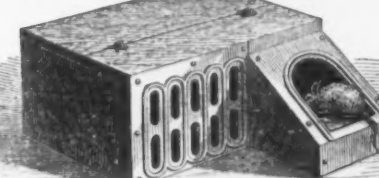
H. McDONALD, Patentee,
MANAGER SLIGO ROLLING MILLS,
PITTSBURGH, PA.

RIPLEY & KIMBALL,
Nos. 907, 909 & 911 N. Main St., ST. LOUIS.
IRON & STEEL BOILER PLATES & SHEETS.
Brass and Iron Fittings for Steam.
Lap-Welded Pipe & Boiler Tubes
RAILWAY AND BOILER MAKERS' SUPPLIES.

AGENCY NATIONAL TUBE WORKS CO.

Delusion Rat and Mouse Trap,

Manufactured by
CLAUDIUS JONES & CO.,
ERIE, Penna.



This is the only Self-setting Trap on the market,
and the most successful.
All orders direct to
CLAUDIUS JONES & CO.,
ERIE, Penna.

THE KEYSTONE
FAST SHACKLE JAIL LOCK



is a new and recently improved Jail Lock, there being as yet but few in the market. They are made of the best malleable iron throughout, highly polished and painted with English vermilion, and have no different changes, and are the best finished, the cheapest and best selling Lock in the market.

FLAGLER, FORSYTH & BRADLEY, Agents,
298 Broadway, N. Y.

COXE BROS. & CO.,
Cross Creek Lehigh Coal.

The Purity and Strength of this Coal especially adapt it for the working of Iron and Metals.

GENERAL OFFICE, Room 12 Trinity Building, 111 Broadway, New York

BRANCH OFFICES, Chicago, Ill., 94 Dearborn Street.

Philadelphia, 220 Walnut Place.

Boston, 2 Exchange Place.

E. B. & S. W. ELY, Agents, P. O. Box 262, N. Y.

TISCHER'S JACK.

No Repairs, Packing
or Alcohol.
NEVER RUNS DOWN
UNDER THE LOAD.



Power applied by means of
ratchet handle from any side,
working right and left.
From 5 to 30 tons.

GEO. A. OHL & CO.,
East Newark, N. J.

Grindstones, Emery, &c.
WALPOLE EMERY MILLS,

Manufacturers of
Genuine Turkish
EMERY,


Emery Cloth and Paper,
Emery Wheels and Machinery,
Flint Paper,
Flint Glue, Crocus, Rouge, &c., &c.,
114 Milk St., BOSTON.

Factory, So. Walpole.
Walter R. Wood,
GRINDSTONES,

Berea, O., Nova Scotia, & other brands
283 and 285 Front Street, New York.

GEO. CHASE,
The largest manufacturers in the world of
OIL STONE

Of all description.
107th Street and Harlem River.
Send for Illustrated Price List. **NEW YORK.**



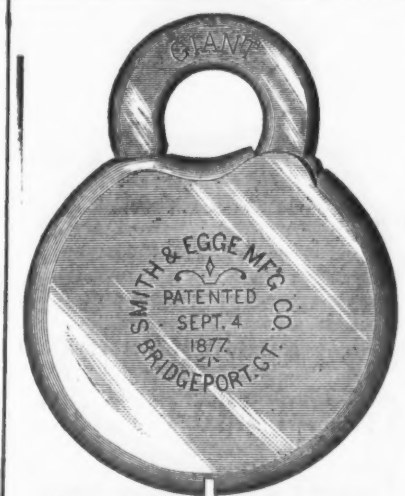
McDERMOTT & BEREA STONE CO.,
Manufacturers of
GRINDSTONES,
Cleveland, Ohio.

OHIO GRINDSTONES.
Superior Ohio Grindstones, manufactured by
P. L. Cole, Constitution, Ohio, will be supplied
to the Southern trade at lowest possible rates by

S. B. LOWE, Southern Agent,
Chattanooga, Tenn.

NEWCASTLE GRINDSTONES
(ENGLAND).
Celebrated for their uniform qual-
ity and keen rasping grit, have now
a world-wide reputation.
For prices apply to
R. ATKINSON & CO.,
Manufacturers,
Office, Guildhall, Newcastle-on-Tyne.

EMERY.
Large stock on hand, especially suited to Saw
and Shovel Manufacturers, at bottom prices.
Importers and Manufacturers of
PURE TURKISH EMERY.
IRVINE, TOWNSEND & CO.,
123 Chambers St., New York.
Send for quotations and samples.



THE GIANT PAD LOCK.
Manufactured by
THE SMITH & EGGE MFG. CO.
(Centennial Award.)

"Superior in Every Respect."
This is one of the best selling Locks in the market,
and affords the dealer a large profit. It is thoroughly
and strongly made of the best material—very hand-
some in appearance, and every Lock is warranted.
Orders solicited. Address as above
Lock Box 1705, Bridgeport, Conn.

THE DUPLEX INJECTOR.

The Best Boiler Feeder
Known.



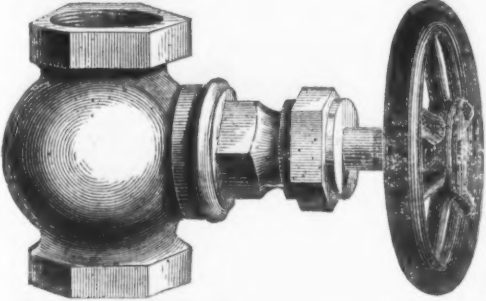
Unequaled for sim-
plicity and always re-
liable. Does not require
adjustment for varying
pressures of steam.
Will start when the
injector is hot.
Less liable to get out
of order than a pump.
Always delivers water
hot to the boiler.

Manufactured and for Sale by
JAMES JENKS,
16 & 18 Atwater St., East,
DETROIT, MICH.

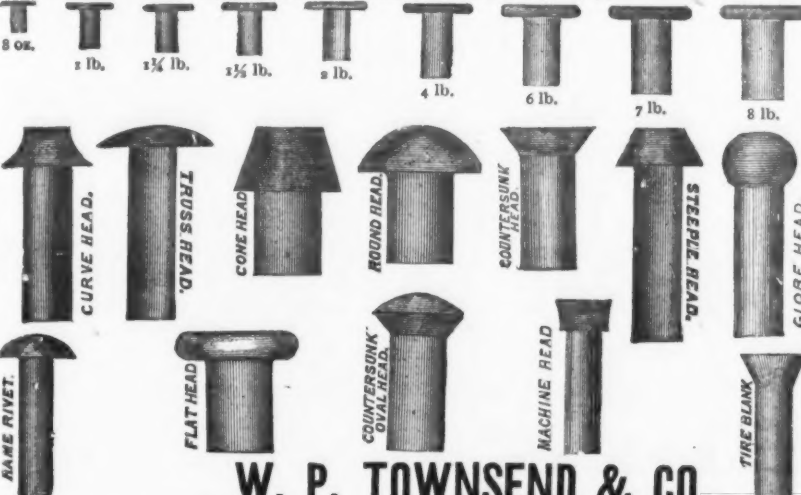
BOSTON.
Reported by Macomber, Bigelow & Dimes.

ANVILS.—"Eagle American"..... \$ 10.00
No. 1, 4 1/2 x 1 1/2, 1 1/2 to each..... \$ 10.00
No. 2, 4 1/2 x 1 1/2, 1 1/2 to each..... \$ 10.00
No. 3, 4 1/2 x 1 1/2, 1 1/2 to each..... \$ 10.00
No. 4, 4 1/2 x 1 1/2, 1 1/2 to each..... \$ 10.00
No. 5, 4 1/2 x 1 1/2, 1 1/2 to each..... \$ 10.00
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No. 7, 4 1/2 x 1 1/2, 1 1/2 to each..... \$ 10.00
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No. 9, 4 1/2 x 1 1/2, 1 1/2 to each..... \$ 10.00
No. 10, 4 1/2 x 1 1/2, 1 1/2 to each..... \$ 10.00
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No. 24, 4 1/2 x 1 1/2, 1 1/2 to each..... \$ 10.00
No. 25, 4 1/2 x 1 1/2, 1 1/2 to each..... \$ 10.00
No. 26, 4 1/2 x 1 1/2, 1 1/2 to each..... \$ 10.00
No. 27, 4 1/2 x 1 1/2, 1 1/2 to each..... \$ 10.00
No. 28, 4 1/2 x 1 1/2, 1 1/2 to each..... \$ 10.00
No. 29, 4 1/2 x 1 1/2, 1 1/2 to each..... \$ 10.00
No. 30, 4 1/2 x 1 1/2, 1 1/2 to each..... \$ 10.00
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No. 32, 4 1/2 x 1 1/2, 1 1/2 to each..... \$ 10.00
No. 33, 4 1/2 x 1 1/2, 1 1/2 to each..... \$ 10.00
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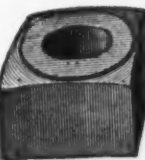
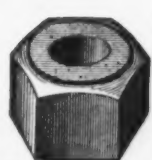


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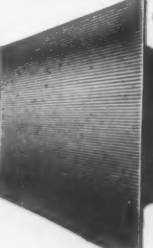
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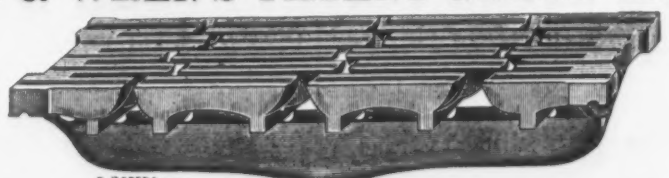
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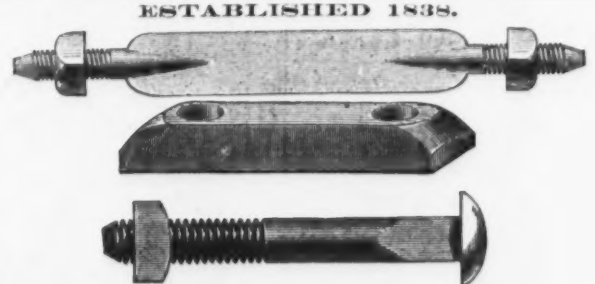


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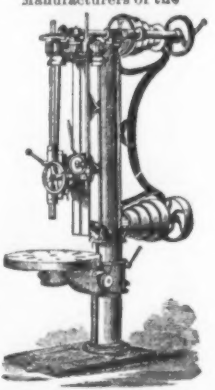
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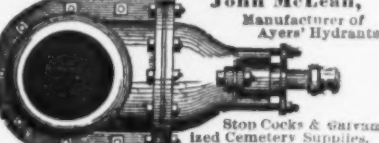
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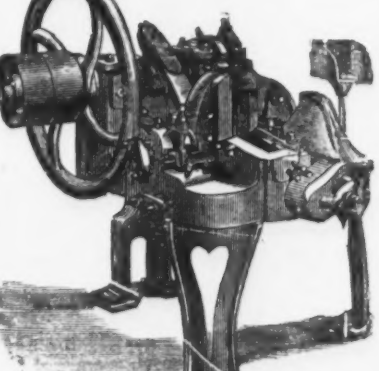
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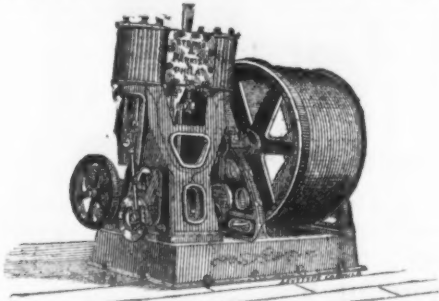
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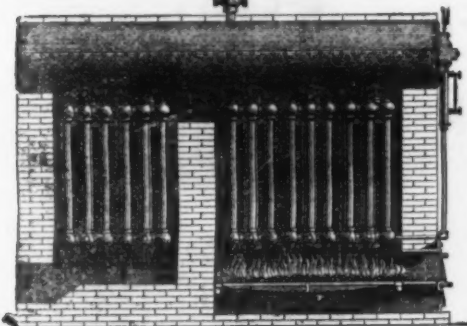
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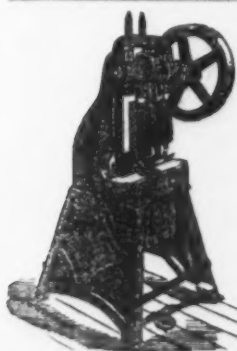


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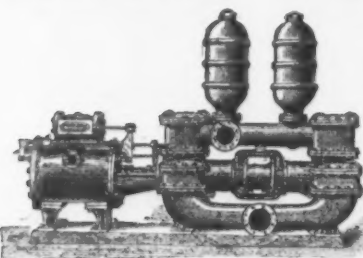
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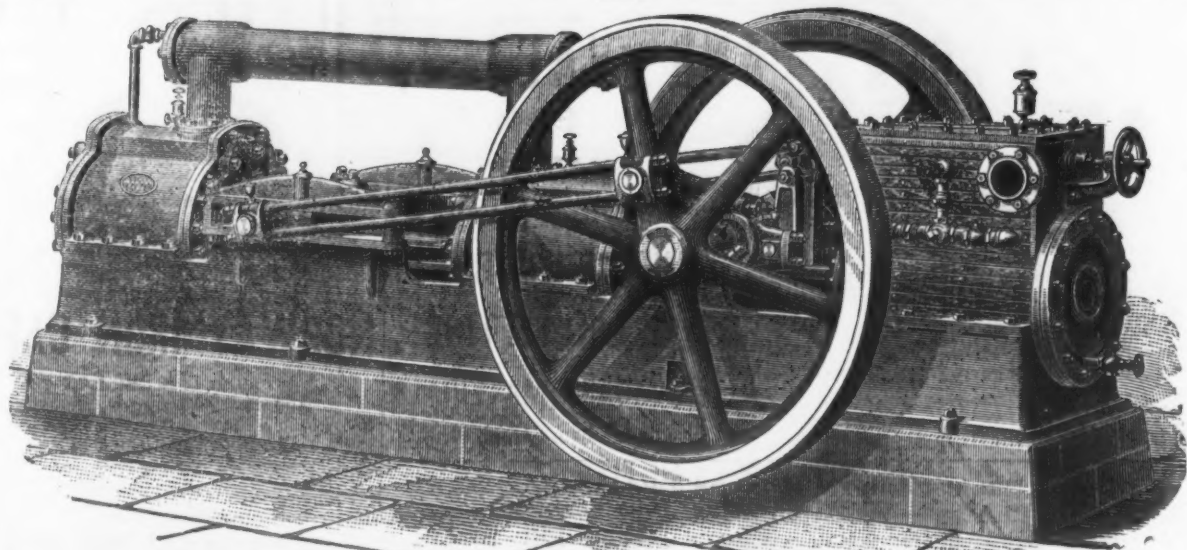
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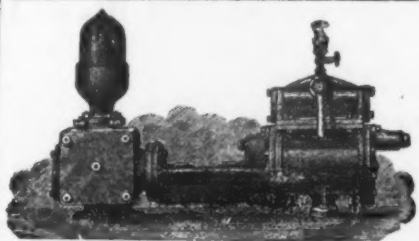
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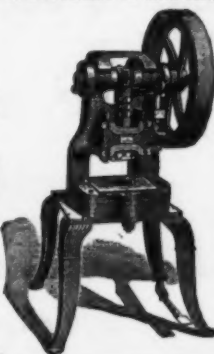
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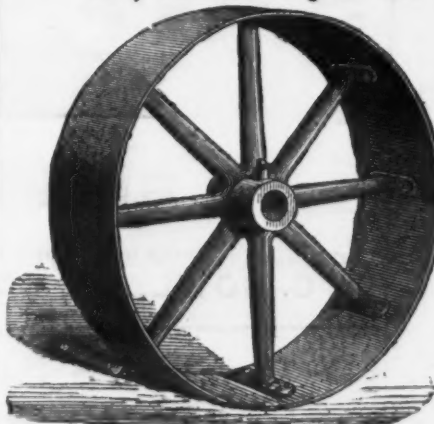
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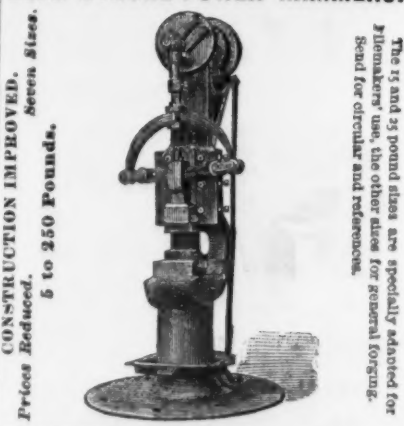
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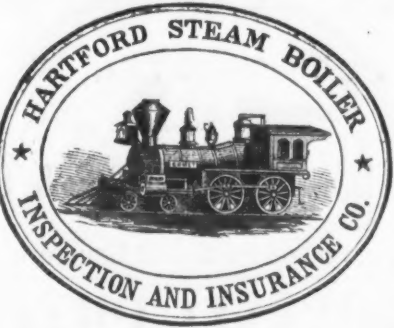
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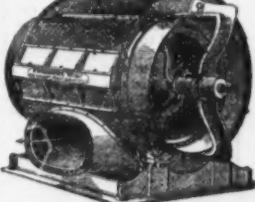
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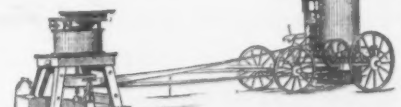
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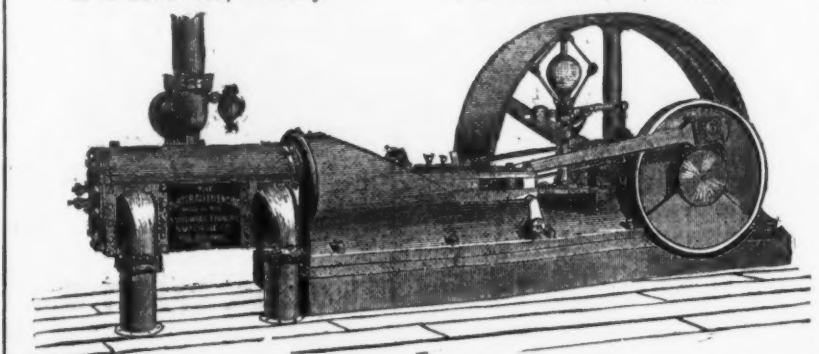
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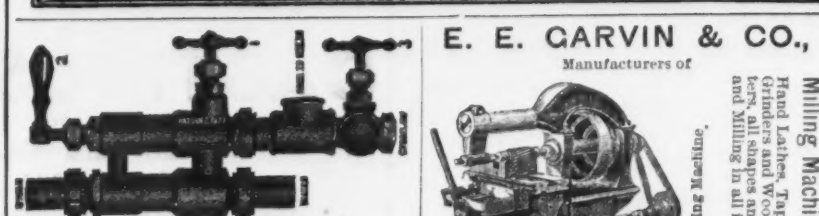
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Send for book giving full description, reduced prices, and many letters of commendation from leading manufacturers and others throughout the country who are using them.

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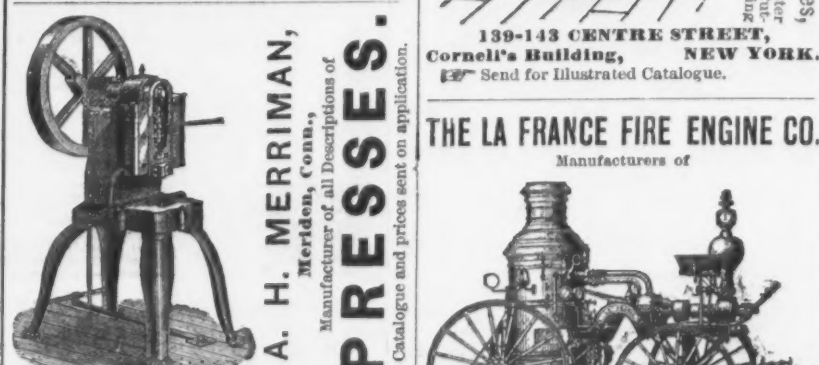


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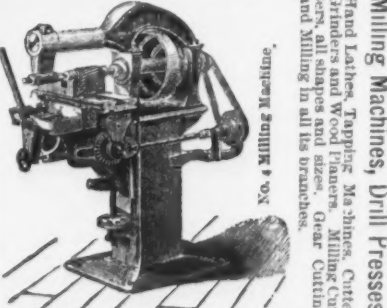
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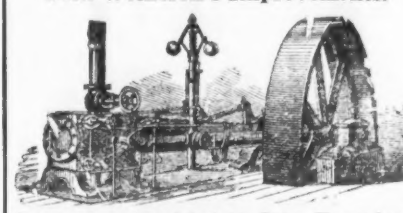
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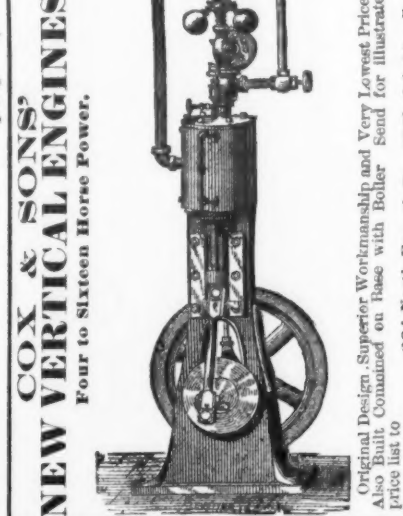
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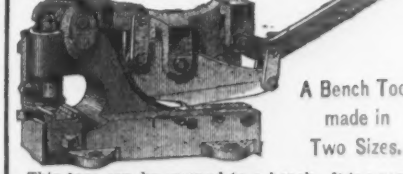
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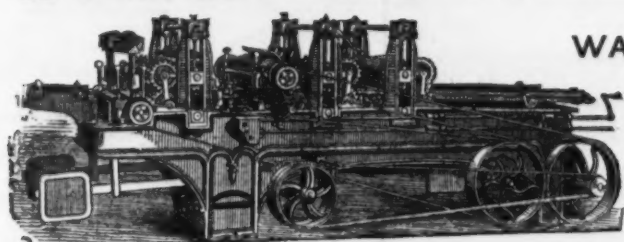
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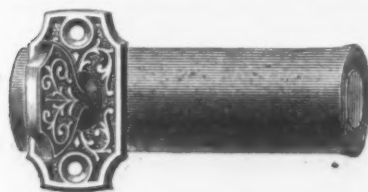
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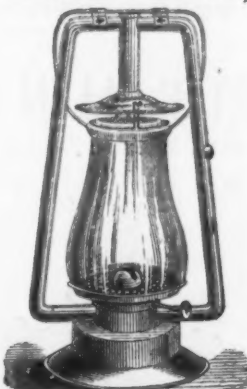
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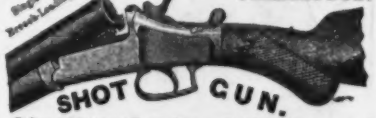
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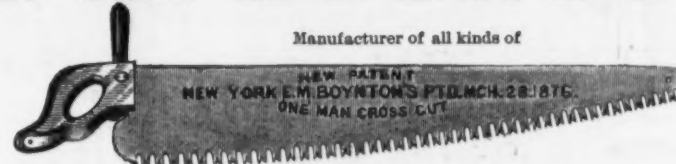
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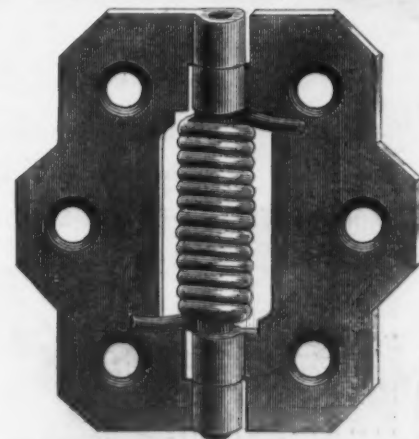
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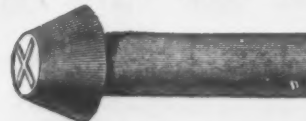
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